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STRATEGIC MARKET PERSPECTIVE

**Federal
Telecommunications
Market**

1994-1999

Federal Market Analysis Program

Federal Telecommunications Market

1994–1999

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Abstract

INPUT estimates that the federal government communications and network services market will increase from \$4.5 billion in FY 1994 to \$7.2 billion by FY 1999, compound annual growth rate of 10%. Network management will be the fastest growing subsegment of this market.

The shift anticipated earlier from voice being the dominant user to data will be evident before the end of this forecast period. The 60% voice to 40% data ratio will begin to reverse, if not already be reversed, by FY 1999.

Budget constraints and procurement reform will continue to impact procurement considerations; however many of the government's current objectives such as electronic commerce, the national information infrastructure, paper work reduction, etc., cannot be met unless the focus on upgrading the overall government infrastructure continues. Effective, efficient, available communications is a necessity to reach these objectives.

This report highlights major telecommunications issues and priorities within the federal government and identifies opportunities and strategies applicable to pursuit of business in the telecommunications market.

This report contains 106 pages, including 41 exhibits.

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Federal Market Analysis Program

***Federal Telecommunications Market,
1994–1999***

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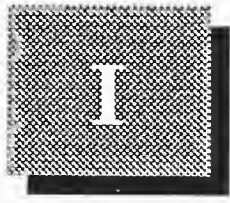
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Introduction

INPUT prepared this revised report on telecommunications systems and services in the federal government as part of the Federal Market Analysis Program (MAR). Research for this revision is based on new analysis of the INPUT Procurement Analysis Report (PARs), and interviews with agency telecommunications officials. Additional research included reviews of previous INPUT reports, federal procurement documents, review of federal information technology budget plans, and analysis of current issues in the trade press.

A

Scope

Analysis in this report addresses telecommunications system and services programs listed in the OMB/GSA Five-Year Plan for fiscal years (FYs) 1994-1999, related long-range information resource plans, and federal agency FY 1994 and 1995 information technology budgets. Earlier versions of the Federal Telecommunications Market report included data gained through interviews with government and vendor personnel. Applicable elements of the interview data have been retained for the 1994 version. Agencies selected for new interviews include those that currently use telecommunications services or products. Contractors who were active in federal telecommunications programs or are listed as vendors of telecommunications services or products in INPUT's Vendor Analysis Program data base for 1994 made up the list of vendors INPUT selected for interviews.

B

Methodology

INPUT analysts reviewed the OMB/GSA Five-Year Plan and the INPUT Procurement Analysis Reports for communications programs initiated during fiscal years 1995-1999. INPUT also examined agency A-11 submissions for fiscal years 1994 and 1995 for additional information on

communications requirements embedded in distributed data processing and office automation programs. The available agency long-range ADP plans for FY 1994-1998 and 1995-1999 were also reviewed to identify plans for forthcoming major telecommunications systems and services contracts. For both previous and current versions of the Federal Telecommunications Market report, INPUT developed questionnaires for interviewing federal agency officials and telecommunications vendor executives. The agency questionnaire was designed to obtain information about plans for future use of telecommunications systems and services. The vendor questionnaire was designed to obtain information about current and future plans from major vendors of telecommunications products and services. Both questionnaires included similar questions about contracting policy and preference, technical standards, and vendor performance perceptions. A copy of the agency questionnaires is included in Appendix G. Federal agency officials selected for interviews included executives (policy makers) and program managers (users). Vendor representatives selected for interviews included company executives and high-ranking marketing personnel.

C

Report Organization

Following this introduction, the report is divided into five sections.

Chapter II--Executive Overview--summarizes the major points and findings in the report.

Chapter III--Market Analysis and Forecast--includes INPUT's analysis of the telecommunications sectors of the Federal Information Technology Budget for fiscal years 1995 through 1999. This chapter also addresses major market factors, agency forecasts, and vendor shares in various market segments.

Chapter IV--Agency Requirements--provides commentary on key regulation and policy agencies and on agency plans for acquiring telecommunications systems. The chapter also includes a discussion of current standards, protocols, and compatibility issues in the federal telecommunications market.

Chapter V--Implications of FTS 2000 Follow-on--provides a summary of current FTS 2000 services and analyzes agency comments about the FTS 2000 follow-on.

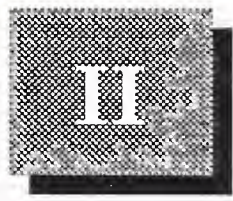
Chapter VI--Competitive Trends--provides analysis of the competitive environment in three key telecommunications market segments. This chapter also identifies the top five market leaders in each segment, and

reviews the product mix in major federal contract awards over the past two years.

Several appendixes are also provided:

- Interview Profiles
- Telecommunications Opportunities
- Glossary of Federal Abbreviation
- Policies, Regulations, and Standards
- Related INPUT Reports
- Federal Agency Questionnaire

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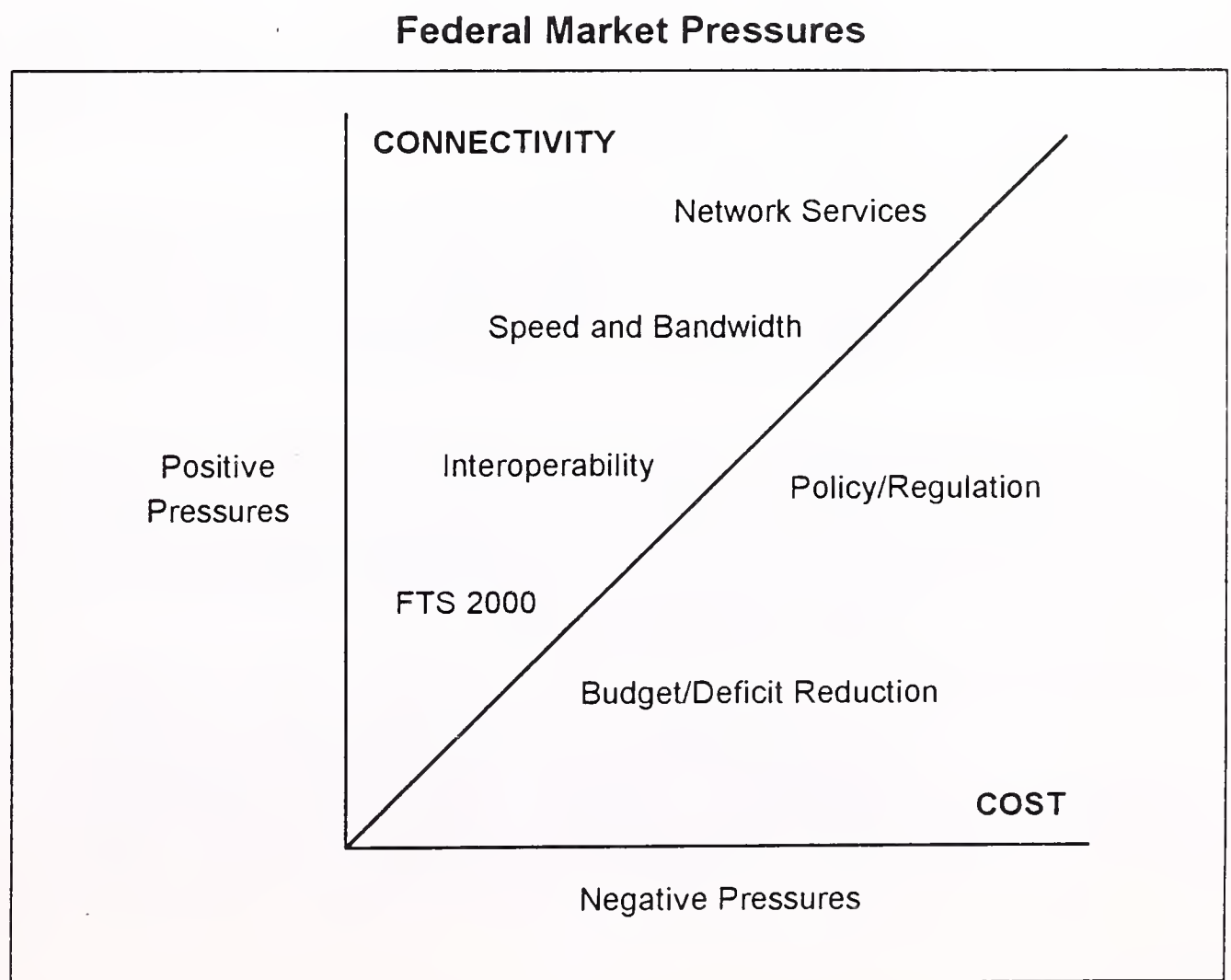
Executive Overview

A

Federal Market Pressures

The federal market for telecommunications products and services is buffeted by two conflicting forces. Increasing demand for speed and connectivity solutions is exerting a strong positive pressure. This positive pressure is being counteracted by strong negative pressures related primarily to cost. Exhibit II-1 summarizes the key positive and negative pressures.

Exhibit II-1



On the positive side, the availability of the enhanced Federal Telecommunication System (FTS) 2000 services represents a strong pressure. Agencies and departments that had been holding plans in abeyance four years ago while FTS 2000 was being contracted and implemented have now moved forward. While FTS 2000 continues to evolve, agencies are making use of features and services not previously available.

The ability to interconnect disparate devices and systems is also creating positive pressure. Although GOSIP, as originally conceived, is out of favor, agencies are still showing increased interest in standardized products and services. While TCP/IP is the dominant protocol for open networks, agencies want seamless connectivity with IBM's Systems Network Architecture (SNA) and local protocols, such as Novell's Interconnect Protocol Exchange (IPX).

In addition to network-based pressures (FTS 2000) and physical/logical connectivity pressures (bandwidth, speed, interoperability), agencies and departments are increasingly interested in messaging services such as electronic-mail (E-mail) and electronic commerce (EC) that will increase the reliability and speed of communications.

One driving force in network services is the increasing need for electronic information services to access a wide variety of on-line data bases. A smaller but rapidly growing component of network services is the use of network applications.

Positive pressures are counteracted by two major negative forces. The first is the demand for budget/deficit reduction and policies that make connectivity more difficult to achieve. The second is the very lengthy federal information technology (IT) acquisition process.

Budget/deficit reduction considerations will continue to impact agencies' ability to implement modern telecommunications technology. Planners must continue to make compromises between solutions that will provide a base for future growth and needs to meet current requirements with increasingly limited funds.

Policies/regulations that necessitate lengthy acquisition processes can delay the implementation of productivity-enhancing telecommunications technology. In addition, policies that mandate specific standards, such as the Government Open Systems Interconnect Protocol (GOSIP), will exert a negative pressure due to the limited variety of certified products.

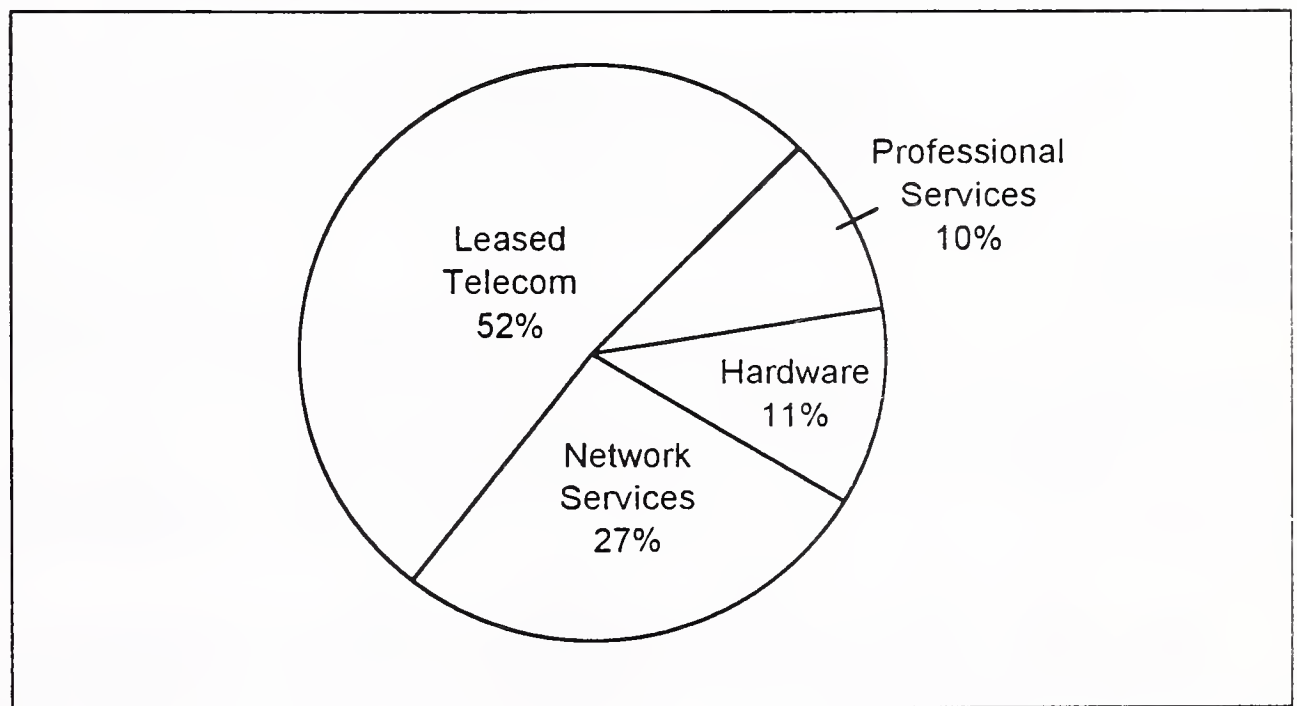
Overall, positive pressures are expected to outweigh the negative pressures, since timely and effective communications is a growing need.

B**Federal Telecommunications Market Segments**

This market forecast focuses on several specific types of telecommunications systems and services commercially acquired by the federal government, as shown in Exhibit II-2.

Exhibit II-2

Federal Telecommunications Market Segments, 1994



- Leased telecommunications services, including common carrier connections, local-area and wide-area network services constitute about 52% of telecommunications services procurement, down from 1992's 57%.
- Network services, such as value-added (packet switch) networks, E-mail, and electronic commerce services represent approximately 27% of expenditures, down slightly from 30% in 1992. Network services also includes access to public data bases to obtain information for analysis.
- Hardware, such as cabling, switching equipment, and satellite ground stations, account for about 11% of annual expenditures.
- Professional services, such as network design, network management, installation, and equipment maintenance represent approximately 10% of outlays, up significantly from 5% in 1992.

The forecast also includes some telecommunications hardware and services acquired as part of other information technology programs, such as office automation and information systems, distributed data processing, and both C2 (Command and Control) and C3 (Command, Control, and Communications) acquisitions.

Local telephone service and the communications components of many intelligence and defense tactical/weapons systems are funded by the government outside of agency information technology budgets and consequently fall outside the scope of this market forecast.

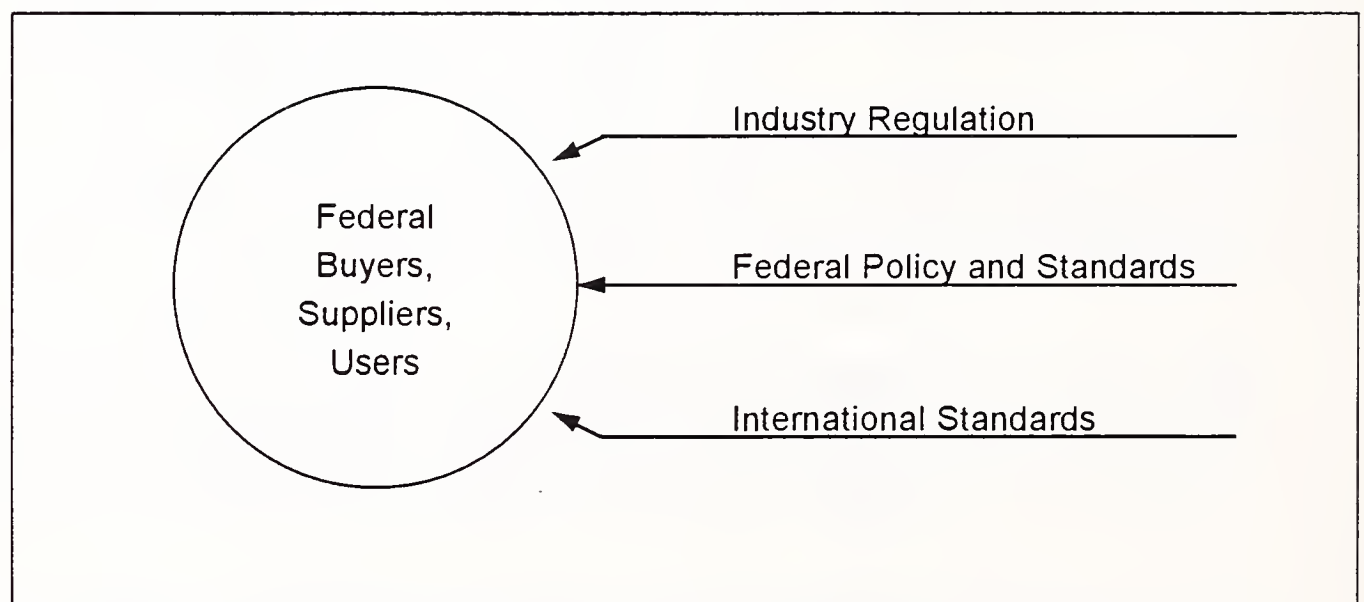
C

Market Environment

The federal telecommunications market is shaped by procurement activities of the agencies and by a variety of regulatory, policy, and standards influences, as shown in Exhibit II-3.

Exhibit II-3

Federal Telecommunications Market Environment



Most federal agencies are both buyers and users of telecommunications systems and services. Several agencies, however, function primarily as buyers or resuppliers of telecommunications resources for other agencies.

- General Services Administration (GSA), through the FTS 2000
- Defense Information Systems Agency (DISA)
- U.S. Army as executive agency for DoD
- U.S. Air Force and DoD executive agencies
- Defense Commercial Communications Office (DECCO)

Other federal agencies influence the market primarily through regulation, policy, and standards activities. These agencies include the Federal Communications Commission (FCC), National Telecommunications and Information Administration (NTIA), National Institute of Standards and Technology (NIST), Office of Management and Budget (OMB), and the National Security Agency (NSA). Since federal telecommunications access extends outside the government and across international boundaries, the market also is subject to external pressures from:

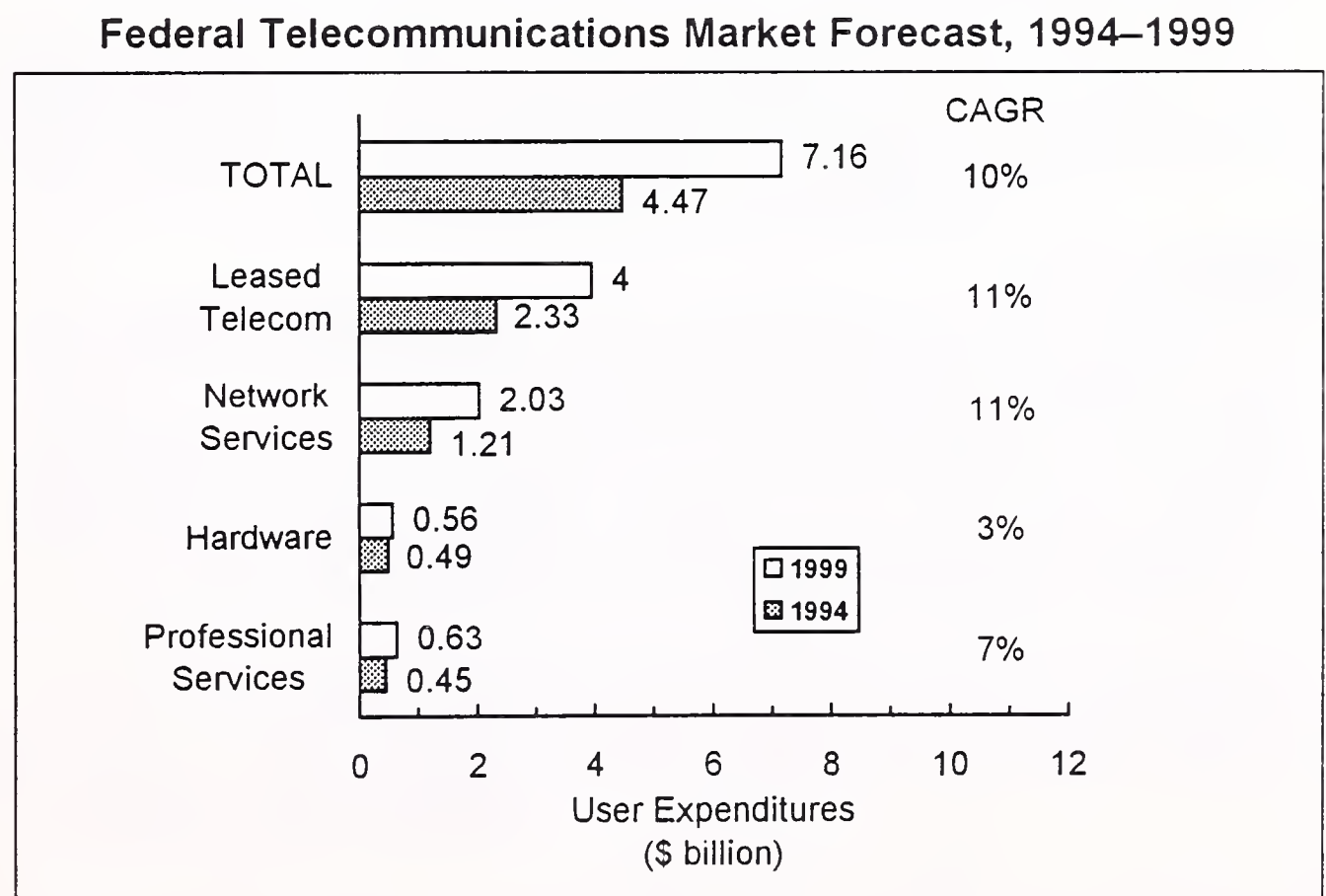
- International organizations such as the International Standards Organization (ISO) and the International Telecommunications Union (ITU)
- National industry organizations such as the American National Standards Institute (ANSI)
- Postal, Telegraph and Telephone (PTT) organizations in foreign countries

D

Market Forecast, 1994-1999

INPUT estimates that the federal government telecommunications market will increase from \$4.47 billion in FY 1994 to \$7.16 billion in FY 1999 with a compound annual growth rate of 10%, as illustrated in Exhibit II-4.

Exhibit II-4



The overall market size continues to grow and the growth rate is approximately the same as earlier forecasts. Unlike virtually every other category tracked by INPUT, telecommunications spending by Defense agencies accounts for more than half of the federal total. Thus, additional budget cuts resulting from what is commonly called "the peace dividend" could lower the growth rate of telecommunications.

Spending on network services has grown considerably. In the past year, several agencies have announced initiatives, many of them documented in INPUT's PAR data base for both value-added networks (VANs) and EC applications.

Finally, FTS 2000 is exerting conflicting pressures on the federal market. On the one hand, prices (at least for voice services) are lower, reducing agency costs. Also, the traditionally high charges for data transmission are being reduced. On the other hand, the enhanced capabilities of FTS 2000 are beginning to stimulate latent demand among many agencies for new services and features.

Leased circuits and network services will exhibit the highest growth rates, both with a compound annual growth rate of 11%, with professional services close behind at 7% CAGR.

E

Technical Trends

FTS 2000 has been implemented and accepted by most agencies. With the de facto adoption of TCP/IP for WANs, connectivity and interoperability standards are becoming clearer. Exhibit II-5 outlines the expected technical trends.

Exhibit II-5

Technical Trends

- Increasing technology acceptance
- Demand for speed and bandwidth
- Voice/data integration
- Increasing service orientation
- LAN-to-WAN connectivity
- Increased emphasis on interoperability
- Increasing security concerns

New technology acceptance is beginning to grow. Greater acceptance is expected over the next five years. However, initial focus will be on capabilities such as the integration of voice and data. Agencies are expected to begin the integration process through basic capabilities provided by FTS 2000. This is the same approach taken by the private sector. A few agencies require advanced technologies not yet available through FTS 2000.

Although the private sector may have a greater availability of funds, it is equally cautious about committing to technology that changes quickly and could lock buyers into a technological approach for an extended period. With extended procurement and life cycles, the federal sector will be equally cautious, giving preference to proven technology and services.

A general lack of staff expertise will cause agencies to increase their emphasis on single sources of supply where possible. This will tend to drive agencies toward use of services such as FTS 2000. Agencies will also be driven toward the use of integrators that are able to deliver complete solutions. FTS 2000 will continue to expand the scope of available services and technologies.

LAN and LAN-to-WAN connectivity is a growing need for agencies, as it is in the public sector. With many basic needs being met through FTS 2000, agencies will place increased emphasis on connecting their large numbers of disparate LANs. LAN interconnection will be accompanied by connection of LANs to wide-area networks such as FTS 2000.

With growing network connectivity, interoperability will be a growing necessity. With a wide range of system standards already in place, agencies are expected to look for services, hardware, and software that will permit greater communication between systems.

As it does in the private sector, ISDN remains an enigma to federal agencies. Agencies recognize the benefits of being able to integrate voice, data, text, and video, but are unable to clearly identify specific services that relate to their needs. Though this should change over the next few years, most agencies continue their wait-and-see approach to integrated services digital network (ISDN). In the meantime, interest is building in technologies, such as asynchronous transfer mode (ATM) and Sonet.

Federal agencies are growing more concerned about telecommunications security and are requiring end-to-end encryption even for systems that handle non-sensitive information. Passage of the Computer Security Act has heightened this concern.

F

Issues and Problems

Federal agencies and the private sector organizations experienced similar problems entering the post-divestiture era, as shown in Exhibit II-6. The government encountered more and greater problems because it is the world's single largest customer for commercial telephone service. Although most service problems have now been resolved, several issues remain.

Exhibit II-6

Agency Problems and Issues

- Budget constraints
- Reorganization and staff shortages
- Technological complexity
- Procurement processes and problems

Agencies continue to express growing concern over budget reductions. The impact on telecommunications programs may be mitigated, however, by cost trade-offs between actual travel and "travel by telecommunications". INPUT has observed that a more common problem is approved money not being spent.

Agencies remain unprepared for the staffing impacts of divestiture and integration of voice and data communications organizations. Agencies believe they cannot compete with the private sector to recruit scarce, highly qualified telecommunications specialists. This problem is not limited to telecommunications areas. Rather, it pervades virtually all highly technical areas in the government. This problem represents an obvious opportunity for contract service providers.

Agencies, already constrained by inability to attract a wide range of technical expertise, must increasingly work to have systems and networks that are interconnected, interoperable, secure, and provide a free flow of data and information.

Protests and congressional investigations have substantially changed the bidding conditions and award schedules. As a result, agencies are increasingly inclined to use approved facilities and services, such as FTS 2000, except in cases where there is an overriding need for separate networks.

G

Leading Agencies

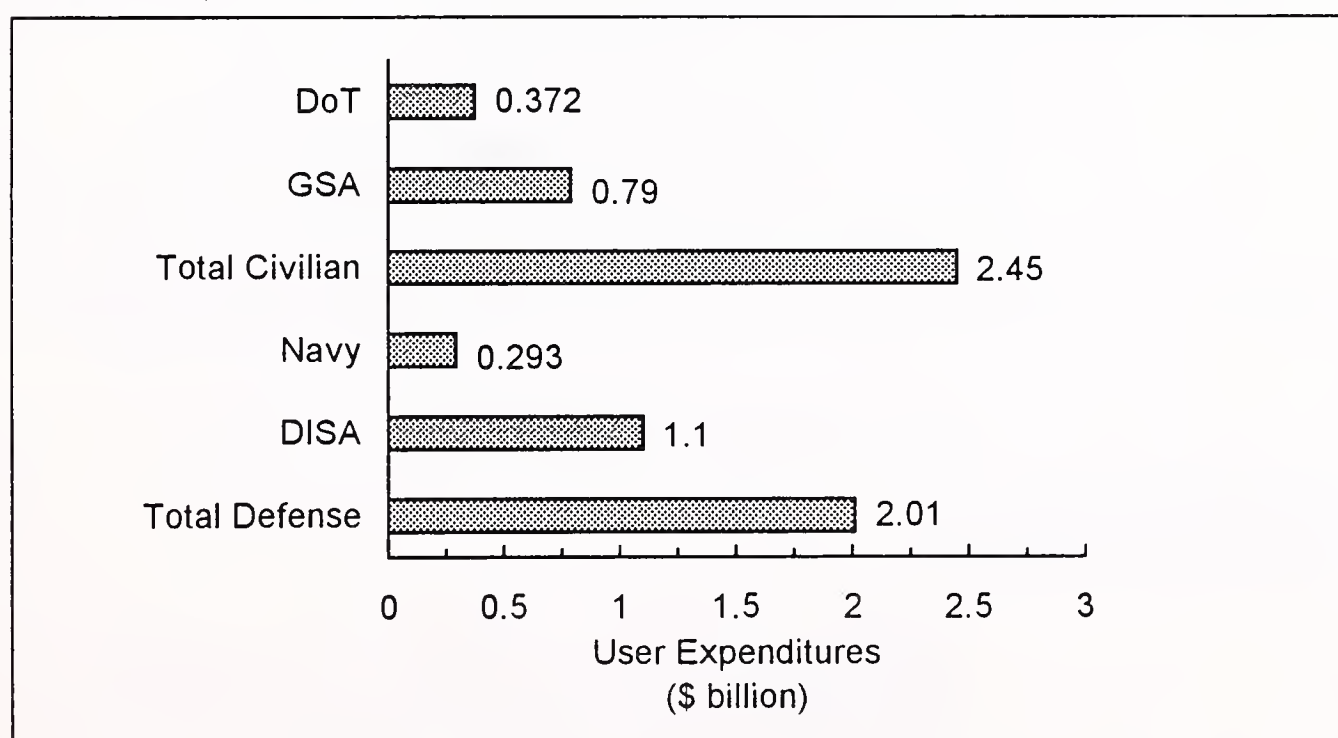
Although all federal agencies buy some commercial telecommunications systems and services directly, the annual procurement by DoD represents a substantial portion of the total telecommunications expenditures. Most of the major new telecommunications initiatives from FY 1995 through FY 1999 come from DoD and GSA.

- Defense communications (DISA) will continue its evolution to the Defense Data Network (DDN), the Defense Switched Network (DSN), and the FTS 2000 system. New initiatives will include the joint world-wide command and control systems modernization (known as "WAM") program and projects to integrate LANs and connect LANs with WANs. The Desert Storm operations, as well as subsequent actions such as Somalia and Haiti, verified the need and value of the newer telecommunications capabilities.
- On the civilian side of the federal government, GSA will continue its telecommunications initiatives by expanding and enhancing FTS 2000 capabilities. GSA will also be placing greater attention on LAN connectivity requirements, continuing to structure umbrella contracts that provide standardized solutions. Through these network initiatives, GSA expects to be able to provide a significantly enhanced infrastructure within which agencies will be able to meet their needs.

The major federal telecommunications buyers are listed in Exhibit II-7.

Exhibit II-7

Leading Federal Telecommunications Buyers/Suppliers, 1994



H

Competitive Outlook

AT&T is fighting to retain its dominant market position. The success of US Sprint on FTS 2000 has changed the market structure. AT&T has been successful as a team member in several recent new network procurements. However, AT&T is being challenged by a variety of firms seeking specific market niches in the government.

Aside from the provision of local service, the Regional Bell Operating Companies (RBOCs) may not be a significant force in the federal market during the next several years. The RBOCs will be largely limited to providing service within their own local areas. The exception will be the unregulated portion of some RBOCs which are becoming increasingly aggressive in providing niche products and could begin providing gateway services in localized geographic areas. INPUT believes that the provision of gateway services will become increasingly liberalized over the forecast period.

Many firms and trade associations continue to exert heavy pressure on Congress and GSA to limit the scope of FTS 2000. INPUT does not believe they will be successful. Congress and GSA have emphatically made FTS 2000 a mandatory contract. GSA has eagerly added new services and offerings to the contract. Only a successful legal challenge could stop this trend. The competitive outlook is detailed in Exhibit II-8.

Exhibit II-8

Competitive Outlook

- AT&T less dominant
- Niche markets important
- FTS 2000 follow-on competition
- Increased services/support
- Increased systems integration

I

Recommendations

All telecommunications vendors need to invest more effort in understanding agency missions and communications requirements. This understanding may be difficult to achieve, yet will be a key factor in successful bids for agency-wide telecommunications systems that support more than one mission.

Since the government continues to experience a shortage of telecommunications expertise, vendors can improve their pre-bid positions by providing education, technology forecasts, and planning guidelines through high-level briefings and meetings with federal officials. This marketing effort, as opposed to selling, is a critical element in enhancing federal presence.

Vendors need to provide total telecommunications solutions, including pre-implementation planning and post-implementation service. Agency officials frequently voiced concern over vendors, particularly in the hardware area, that provided inadequate support after installation. As a result, federal buyers are placing increased emphasis on corporate stability and reputation for services.

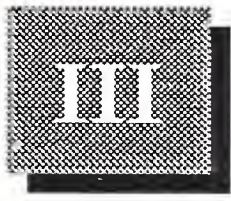
Vendors must move quickly to establish a viable market presence in federal telecommunications. Though the growth of network services will create opportunities, vendors that have not created visibility about their presence and the value of their products will lose market position.

Finally, those vendors not included in the two FTS 2000 contract teams should continue to seek niche markets on the periphery of the FTS 2000 contracts. They should also work with agencies to try to limit the scope of contracts where possible. Exhibit II-9 lists INPUT's recommendations.

Exhibit II-9**Recommendations**

- Understand agency requirements
- Increase marketing, reduce sales
- Emphasize total solution and service
- Establish market position
- Seek FTS 2000 follow-on alliances

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Market Analysis and Forecast

Although the federal telecommunications market has shown signs of increasing volatility, INPUT continues to believe that it will show sustained growth through the remainder of the 1990s. However, while spending will continue to grow, the number of distinct opportunities may decrease, depending largely on how GSA handles the FTS 2000 follow-on. Growth in some segments of the market will level off. This will be offset by new growth in other market segments.

This section of the report presents INPUT's forecast for growth of the federal telecommunications market. It analyzes individual market segments, the competitive environment, and the potential effects of federal policy and regulation during the forecast period.

A

Federal Market Forces Through 1999

There are a number of forces listed in Exhibit III-1 that will drive the federal telecommunications market over the next five years. While some areas and agencies will grow fairly slowly, others will experience very sharp increases in growth.

INPUT believes that the effects of budget constraints will be mitigated somewhat in the federal telecommunications market. Budget reductions actually may increase federal dependence on telecommunications services. A small example of this trend is that teleconferencing and electronic message distribution will be emphasized to reduce travel and other costs. On a larger scale, many agencies will be increasing the use of telecommunications to link dispersed offices and customers to more centralized service providers.

Exhibit III-1

**Major Federal Telecommunications
Market Impacts**

- Budget and deficit reduction
- Policy and regulation
- FTS 2000
- Interoperability
- EC/E-mail
- Technological advances
- Vendor competition

Agency network service contracts typically last seven to ten years; current contracts will not be terminated because of budget constraints. New and replacement network acquisitions, however, may be deferred if agencies can meet their telecommunications requirements through existing federal resources.

Advanced networking services of FTS 2000 and Defense Data Network will stimulate increased use of network services. INPUT believes that the relationship between voice and network services could begin to shift over the next five years. FTS 2000 is currently used about 25-30% for non-voice services, up from 17% in 1991/92. Today, voice services represent an estimated 60% of all leased telecommunications expenditures. Network-based services account for 40%. Near the end of the five-year period, this will begin to reverse.

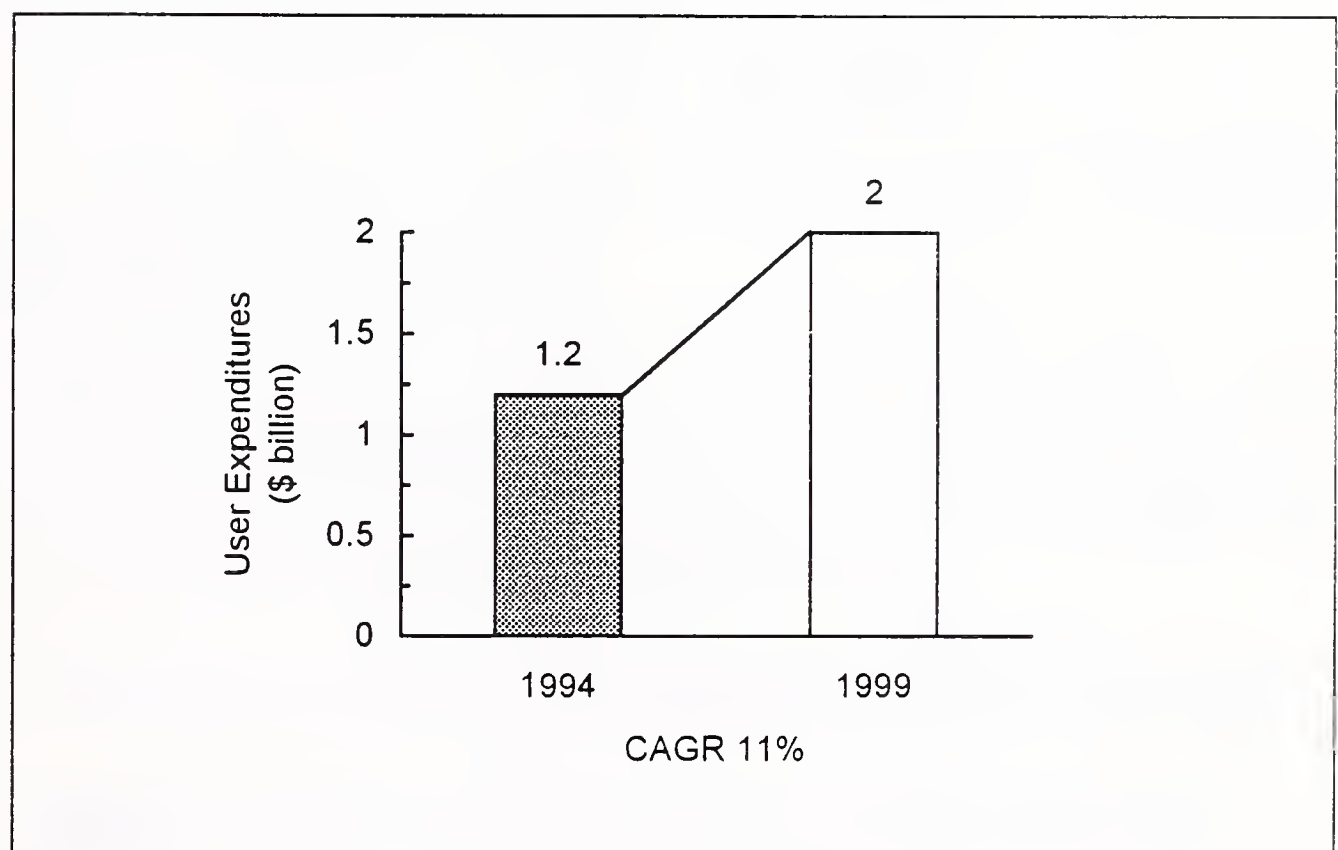
With the emphasis on networking products and services, interoperability will be an increasing requirement. Hardware and software that support network and system connectivity requirements should be in high demand. Although it currently lags behind the explosive commercial growth, electronic commerce (EC) will still grow sharply. This will drive up telecommunications traffic and network service requirements, reducing agency personnel requirements. As more computers tie in directly with their federal counterparts, the volume of information exchange will continue to grow.

INPUT expects the network services market segment to grow from \$1.2 billion to \$2 billion between FY 1994 and FY 1999, at a CAGR of 11%. This is illustrated in Exhibit III-2.

This segment includes some declining components exemplified by the network usage of remote computing (time-sharing) and X.25 data networks. The segment also includes growth areas such as access to on-line data bases, E-mail, electronic commerce, and networked applications. As in the private sector, the government has a growing need to collect and disseminate data, textual, graphic, and image information throughout organizations. This is particularly true for geographically dispersed organizations.

Exhibit III-2

**Federal Network Services
Market Forecast, FY 1994-1999**



An expanded definition of this market segment combined with the identification of additional applicable programs and procurements led to a substantial increase in this market segment over the previous reports. Some other factors will drive the federal telecommunications market:

- Agencies will become more demanding and sophisticated in their telecommunications requirements, initiating their own requirements-type contracts for items outside the scope of FTS 2000.
- Technological advances will change the market character. For example, as better network management tools become available, agencies will come to expect the resulting economies and efficiencies.
- Communications security requirements will increase as a result of the Computer Security Act.
- Security considerations will restrict interaction between local-area networks in DoD, at least in the near future.

Overall, with basic needs satisfied through FTS 2000, competition for add-on and support products and services will become increasingly intense. However, vendors that can provide strong support for unique or niche products and services can find a wider range of opportunities than might be expected.

B

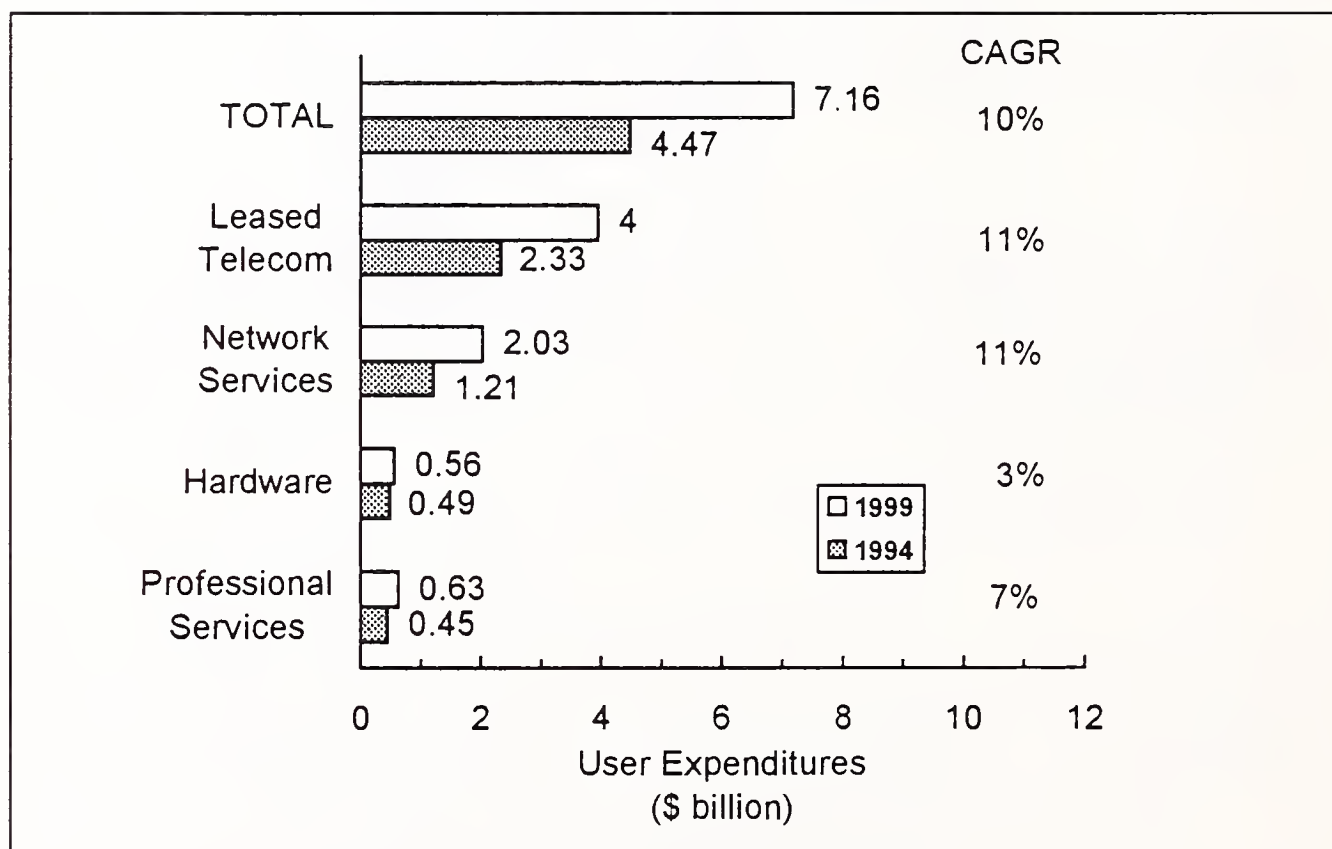
Market Forecast

INPUT expects the federal communications and network services market to grow from \$4.47 billion in FY 1994 to \$7.16 billion in 1999.

This represents a compound annual growth rate of 10%, as shown in Exhibit III-3.

Exhibit III-3

**Federal Telecommunications
Market Forecast, FY 1994-1999**



Leased telecommunications include both leased networks and transmission facilities. Network services includes value-added network services such as electronic information services (EIS), network applications, packet switching, E-mail, and EC. Network services also includes the use of on-line data base services. For a complete description of this market segment, refer to INPUT's report, *U.S. Network Services Market, 1991-1996*. The hardware category includes both communications devices and computer systems that support

telecommunications services. The professional services category includes four elements:

- Consulting
- Education and training
- Programming and analysis
- Network management

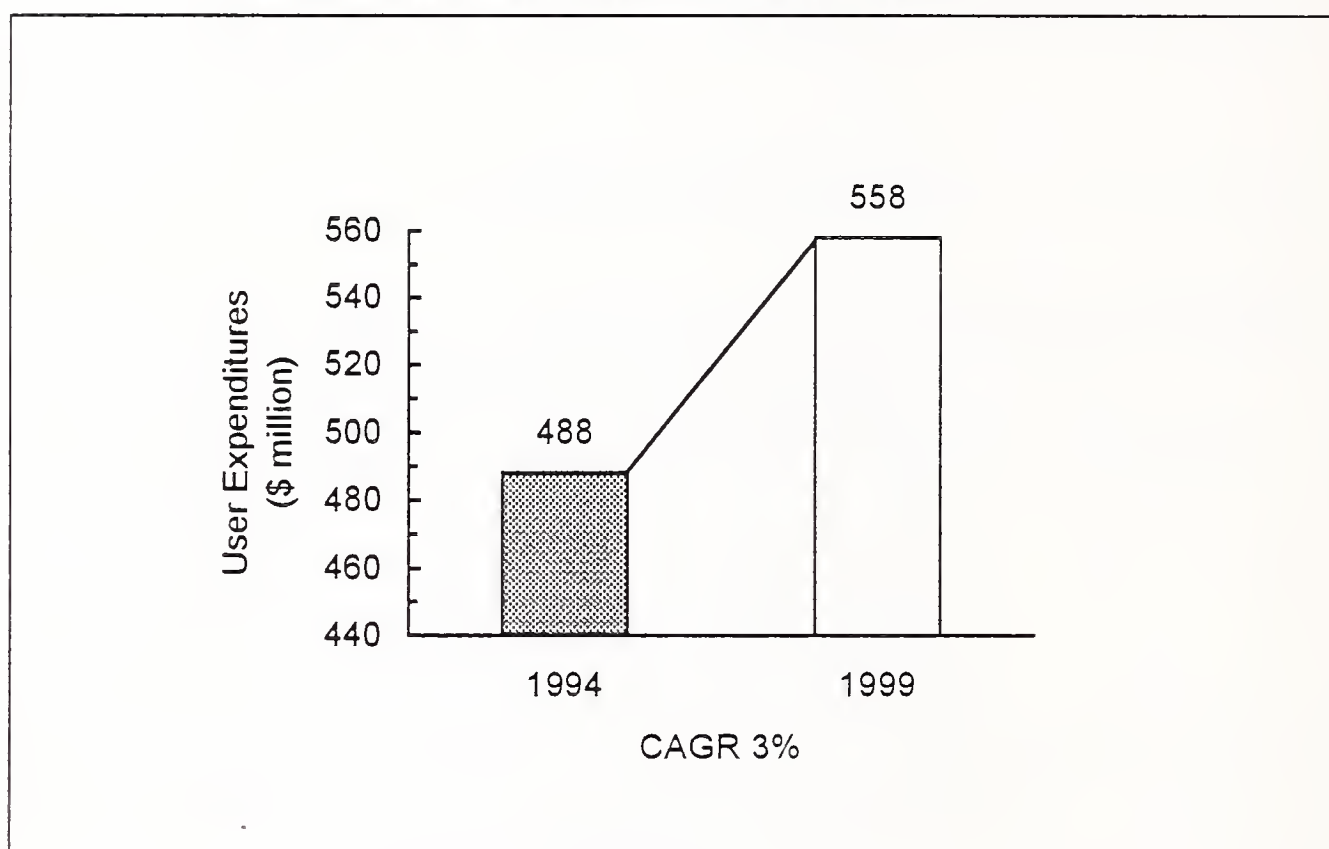
The large percentage of the market attributed to leased telecommunications services (52% in FY 1994 and 55% by 1999) tends to obscure some important trends in the smaller segments. The high professional services growth rate (7%) relative to the overall information technology growth rate (5%) is attributable to the growing requirements for professional expertise to develop strategies to integrate increasingly complex networks and systems. This is also discussed below.

INPUT expects the telecommunications equipment market, shown in Exhibit III-4, to grow at a rate nearly equal to the overall market. In the 1992 report, INPUT had forecast a market for telecommunications hardware of approximately \$598 million for 1997. INPUT now places the 1997 market forecast at \$520 million. There are several factors that account for this fluctuation in the market forecast:

- Often telecommunications equipment purchases are embedded in other integrated acquisitions, making them difficult to identify and quantify.
- Changes in a single very large program can have an impact on the overall market forecast.
- Technological advancements and price erosions have occurred faster than previously forecast.

Exhibit III-4

Federal Telecommunications Hardware Market Forecast, FY 1994-1999

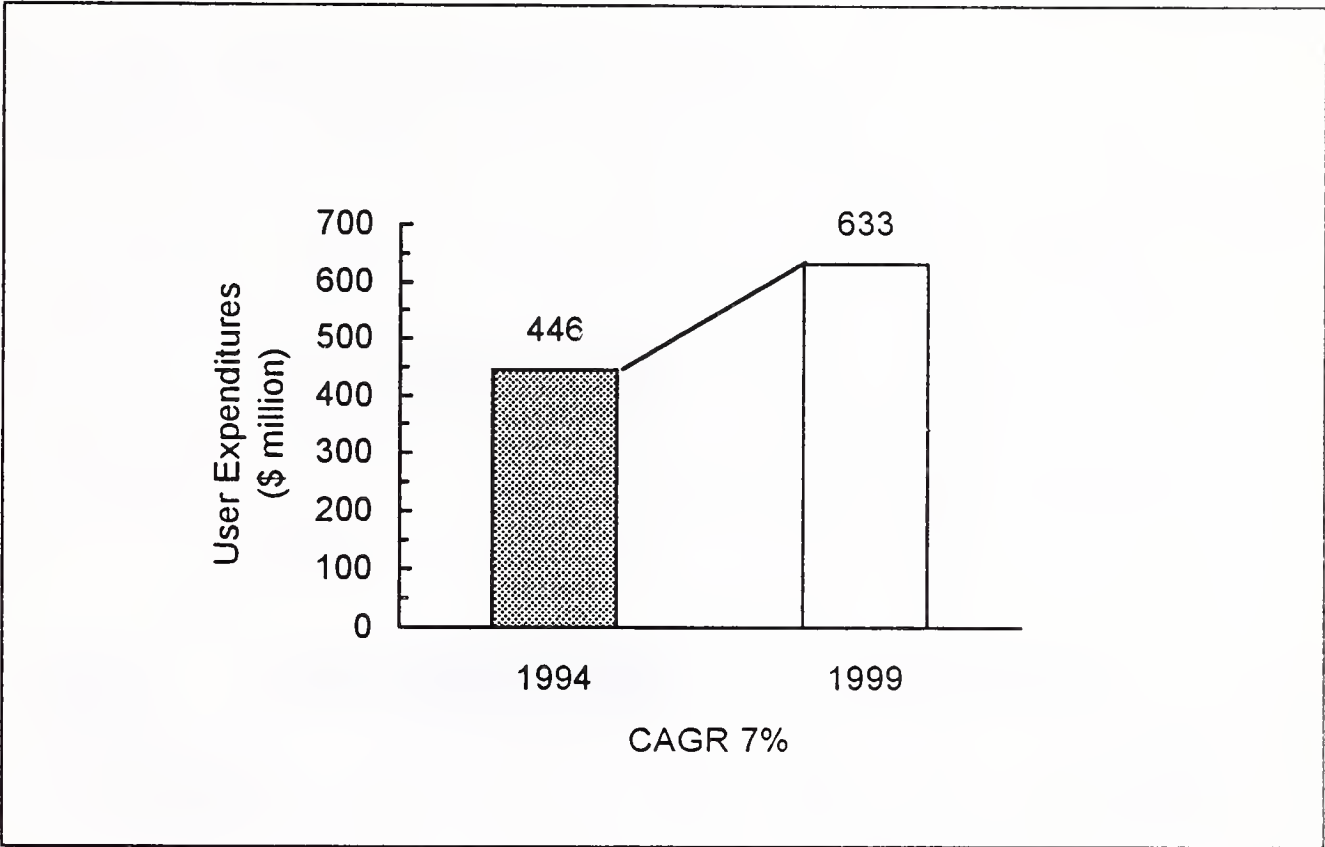


- There has been significant growth in LANs and products to connect LANs together. This is expected to continue.
- With FTS 2000 implemented, networking plans that were being held in abeyance are now being scheduled for implementation, either within FTS 2000 or given waivers to be constructed outside of the system.

INPUT estimates that the professional services segment of the federal telecommunications market will grow from \$446 million in FY 1994 to \$633 million in FY 1999, at a CAGR of 7%, as illustrated in Exhibit III-5. This growth rate is lower than the total telecommunications growth rate shown in Exhibit III-3. The primary reason for this "modest" growth is that professional services are increasingly being delivered as part of systems integration or other contracts, not as separately identified services. The actual growth of professional services is expected to be substantial.

Exhibit III-5

Federal Telecommunications
Professional Services Market Forecast, FY 1994-1999



As in most other information technology areas, agencies are reducing their own technical activities in network planning and management. This is expected to continue, particularly with the assistance of AT&T and US Sprint, as FTS 2000 use grows. Agencies are procuring comprehensive solutions to their telecommunications needs.

Within the telecommunications professional services (education and training, design/consulting, systems development, and network management) network management represents the only real growth area. INPUT believes that this area will see continued growth even beyond this forecast period.

C

Agency Forecast

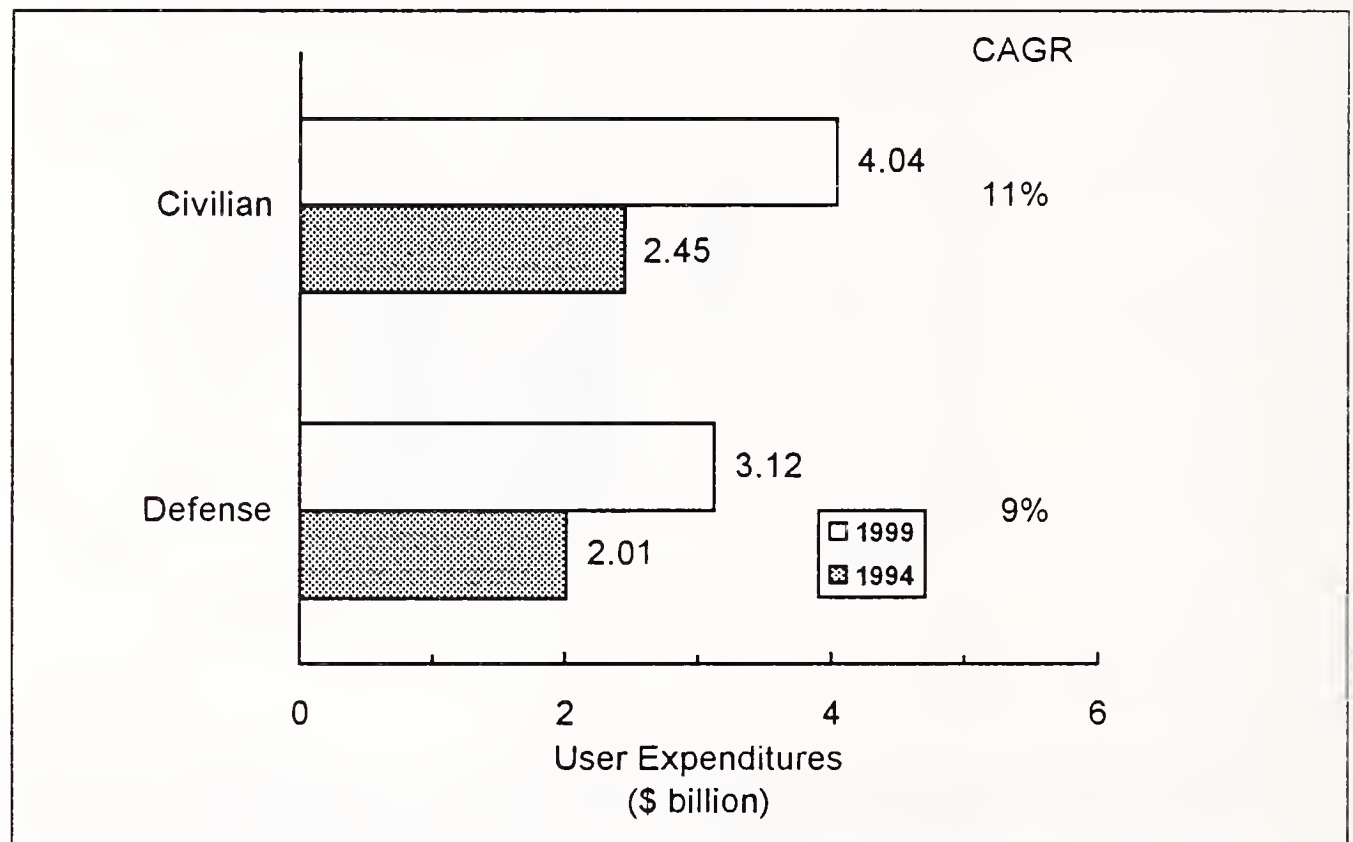
The federal telecommunications market forecast by agency is based on information from long-range plans, Office of Management and Budget (OMB) A-11 submissions, the FY 1994 through FY 1999 budgets of the U.S. Government, and interviews with agency officials responsible for telecommunications programs.

As shown in Exhibit III-6, INPUT estimates relatively equal growth in defense and civilian agencies' spending, with civilian expenditures

representing the greatest proportion. Because of a shift of spending for FTS 2000 from DoD to GSA, these figures require more detailed analysis.

Exhibit III-6

Federal Telecommunications Market Forecast for Defense and Civilian Agency Expenditures, FY 1994-1999



1. Special Defense Considerations

INPUT regards the defense telecommunications forecast as a conservative estimate of the defense market for commercial systems and services. Base or facility communications, which are not acquired through agency-wide programs, are usually not identified in agency information technology budget documents. This is particularly evident for telephone switching equipment that is not part of a command-wide acquisition.

Upgrades to base communications systems and local telephone service typically fall below budget reporting thresholds and may be funded through operation and maintenance budgets. Unclassified programs with a system life cycle cost of over \$25 million must be reported by the military departments in response to Congressional Armed Services Committee directives.

This new reporting limit represents a significant change, equaling the previous one-year limit set for Major Automated Information Systems Review Committee (MAISRC) process. This reporting requirement will increase visibility of DoD spending. However, it should be noted that a

significant amount of defense communications equipment funding is included in weapons programs and strategic systems. This funding is not regarded by DoD as part of the information technology budget.

2. Leased Telecommunications Procurement

Exhibit III-7 shows the current and forecast distribution of leased telecommunications service procurement by agency for major defense and civilian buyers. Several assumptions about the forecast must be noted for interpretation. Both the Army and the Navy are expected to rank as top users of FTS 2000, as measured by interagency payments. For this forecast, however, all FTS 2000 expenditures are included in the civilian numbers, since GSA ultimately acquires the commercial services to support FTS 2000. Total defense expenditures will continue to grow, even while shifting expenditures for FTS 2000 to GSA.

Exhibit III-7

Leading Leased Telecommunications Users

Department/ Agency	FY 1994 (gov. est.)	FY 1995 (gov. for.)
In \$ Million		
Defense:		
OSD; DISA and others	714	766
Air Force	65	71
Army	101	103
Navy	161	143
Civilian:		
General Services Admin.	497	503
Transportation	175	227
Treasury	141	147
Energy	68	72
Health and Human Services	47	52
Veterans Affairs	40	40
Justice	35	39
NASA	34	33
Commerce	26	33
Agriculture	24	25
State	21	21
EPA	20	19

D**Vendor Market Share and Competition**

The current list of potential suppliers of telecommunications systems and services to the federal government has grown to nearly 3,000 companies. However, INPUT believes that the actual number of direct suppliers will diminish under the pressure of intense competition for the federal dollar. Reductions will result from two key factors:

- GSA and agencies are placing increasing emphasis on the provision of solutions, rather than specific products. With this emphasis, there will be a reduction in the number of vendors that provide only specific hardware.
- A high percentage of service requirements will be met through FTS 2000. As a result, products and services that relate to FTS 2000 will frequently be provided as a subcontract to either AT&T or US Sprint. Previously, the same product or services might have been provided directly. Products and services will more frequently be provided as part of systems integration contracts.

Smaller companies, including most start-ups, will be unable to maintain a strong federal market presence because of the size and capital-intensive nature of federal telecommunications programs. Federal agencies will continue to show preference for larger, established federal vendors acting as prime contractors or systems engineering and technical assistance (SETA) contractors.

Although it has been somewhat reduced by requirements of the FTS 2000 contract, AT&T's dominance of the federal telecommunications market will continue. Although holding a dominant position, AT&T remains vulnerable in several specific market segments. Companies such as Contel, Rolm, and Nortel will continue to make inroads in the hardware market segment. Others could find success in niche segments, where a specific product or service is needed. In addition, AT&T revenues will increasingly include revenues that will be passed through to subcontractors.

INPUT expects systems integrators, experienced in the federal marketplace, to gain most in the federal telecommunications market. Agency-wide network integration projects and other network procurements are likely to be suited to the expertise of systems integrators. For a detailed list of vendors by market segment, refer to Chapter VI, Section B of this report.

INPUT believes that traditional value-added network (VAN) vendors will be hard pressed to expand their share of the market in the next few years. The distinction between VAN and common-carrier services is becoming blurred as traditional long-haul communications carriers add features previously available only from VANs. In addition, federal

networks such as FTS 2000 and department- or agency-specific networks will offer services that compete directly with VANs.

E

Technological Impacts

As shown in Exhibit III-8, agencies and vendors generally agree about the types of new technologies that will affect federal telecommunications planning and acquisition in the 1994-1999 time frame. Emerging telecommunications technologies will play a major role in the federal market in the late 1990s. Agencies and vendors generally agree on the timetable for these technologies, but the reasons differ.

Agencies want to avoid risk and stay a comfortable distance behind the leading edge of technology. Vendors believe that telecommunications technology is moving in advance of user requirements in the federal and private sectors, with the lag in the federal sector due to longer system life and procurement cycles.

Some federal agencies may be forced to adopt new telecommunications technology earlier than others. Agencies investing in supercomputer technology to meet high-volume data and computational requirements will encounter communications bottlenecks. Agencies with dispersed facilities in remote areas cannot meet emerging communications requirements through land-line carriers alone and are seeking alternative technologies.

Exhibit III-8

**Technology Impact on
Federal Telecommunications**

Technology	Importance to *	
	Agency	Vendor
Local-Area Networks	High	High
Network Management Systems	High	High
Electronic Mail	High	High
Electronic Commerce	High	Average
Value-Added Networks	Low	Low
Satellite Networks	Average	Low
VSAT Networks	Average	Low
ISDN	Average	Average
Cellular Telephones	Low	Low

* Vendor importance based on ranking, agency importance based on ratings

INPUT's analysis indicates clearly that internetwork reliable connectivity and services are of higher priority than the latest technology.

F

Policy and Regulatory Prospects

Federal Information Resource Management Regulations (FIRMR) have been in effect for several years as the primary source of guidance for agency acquisition, management, and use of automated data processing (ADP) and telecommunications systems. However, frequent changes in the FIRMR have continued to complicate things. The merging of agency ADP and telecommunications functions has slowed and continues to be problematic.

Voice and data communications organizations in most agencies have been merged into the Office of Information Resource Management (OIRM) only recently. But confusion about roles and responsibilities continues. Voice and data communications organizations typically address communications problems differently, making it difficult to achieve perceived economies through personnel reductions. Along with the organizational changes, budget planning and reporting are changing slowly to incorporate both voice and data communications program funding in agency information technology budgets.

Just a few years ago, it was assumed that the federally mandated Government Open Systems Interconnect Profile would become the de facto standard. As agencies resisted the move to GOSIP, because of costs and lack of product availability, the standard was slowly moved to an optional status. TCP/IP quickly filled that void, particularly prompted by the increased interest in the Internet.

In March 1992, US Sprint announced a nationwide TCP/IP network service. The network will connect various LANs using the TCP/IP standard. Congress has already passed several measures to increase agency awareness and formulate computer security policy. The Electronic Communications Privacy Act (Public Law 100-235) requires agencies and vendors to provide end-to-end security and effective encryption for federal telecommunications systems. Among other things, the law specifically addresses the special requirements for protection of computer systems. GSA issued guidelines for implementing the Act.

The National Institute for Standards and Technology (NIST) will monitor and control the computer security program. The National Security Administration (NSA) will use its expertise to develop communication encryption techniques. There are several different levels of computer security to be executed under the legislation. The first actions to be taken

are administrative and physical security measures, such as locked storage in computer facilities. Later phases involve the advancement of new computer systems with built-in security systems.

As is any other consumer, the federal government is subject to regulatory actions taken as a result of FCC Computer Inquiry III.

- Federal agencies must recognize regulatory restrictions and competitive needs in contracting requirements when formulating acquisition plans.
- Given the long-term uncertainties of the regulatory climate, agencies must be prepared to modify acquisition plans with little or no advance notice in response to regulatory or tariff changes.

G

Conclusions

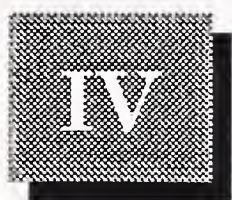
The long system life cycles for federal telecommunications systems will continue to provide a steady revenue stream for incumbent vendors. Further, incumbents will continue to capitalize on extension and expansion opportunities for existing contracts. These include minor hardware and software additions for existing contracts.

As with other federal market segments, INPUT expects fewer but larger contracts. In addition to FTS 2000, system engineering and technical assistance will become more common for new or replacement systems. The continuing shortage of in-house technicians will also increase opportunities for telecommunications hardware maintenance and consulting, particularly for high-technology systems.

The federal telecommunications market does present some substantial risks. Most funding will continue to be concentrated in a relatively few large network procurements. In recent contract awards, agencies have shown a preference for acquiring telecommunications service, directly or indirectly, through systems houses instead of larger established carriers. Also, budget constraints will foster competition for the more certain funding allocated to telecommunications programs.

Overall, though the federal telecommunications market has consolidated, there are attractive opportunities. Vendors that emphasize support and service will be more readily accepted. Vendors with products and services that support interconnection and interoperability will find a growing market. In addition, vendors that establish strong alliances with major network and systems integrators can find significant growth opportunities.

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Agency Requirements

As part of its research effort, INPUT formally and informally interviewed federal officials responsible for agency telecommunications policy, planning, acquisition, management, and use. The views and requirements of users and key policy making agencies, form the basis of the trends presented in this chapter. Since agency needs vary dramatically, a synthesis was performed to describe overall requirements in the most understandable terms. The first section, Agency Plans, has been divided into defense and civilian with discussion of special needs for security and volume processing. The chapter also presents INPUT's findings on technology trends and vendors.

A

Agency Plans

INPUT conducted a survey for this report through several modes, including mail/fax, formal phone interviews, informal phone discussion, and office interviews. A wide variety of requirements were identified that on the surface present a mixed view of agency plans. These requirements have been analyzed and consolidated into several groupings that make some sense for trends and directions. These groupings are:

- Defense and civilian requirements, highlighting several agencies
- Mission and administrative requirements across multiple departments

The latter category is actually the most important. Mission critical requirements cover conditions such as security and transaction processing which are common to certain environments whether in defense or civilian agencies.

1. Defense

While funding for weapons systems and platforms, personnel levels, and even the number of bases has been drastically reduced, funding for

communications systems is increasing. Planned funding for FY 1994–1999 is scheduled to:

- Increase for leased circuits at a CAGR of 10%
- Slightly increase for hardware purchases at a CAGR of 2%
- Moderately increase for professional services at a CAGR of 7%
- Increase for network services at a CAGR of 10%.

These figures represent an overall CAGR of 9% for telecommunications spending in the Defense Department in spite of overall budget cuts.

There are many reasons for these increases of which three are driving factors:

- Interoperability requirements for joint operations in war and peace-keeping missions
- Telecommunications as a multiplier enabling a smaller military to operate as effectively as a larger force
- Telecommunications as a productivity/cost reduction tool in most management and administrative processes

Significant variability exists across the services both in terms of budget projections and percentages of expenditures in the telecommunications categories. While DISA has the lion's share of telecommunications funding in DoD, all three services have planned budgets larger than most civilian agencies. For the planning period of this report, 1994–1999, major DoD components have compound annual growth rates of:

- Air Force 6%
- Army 8%
- DISA 12%
- Navy 8%

The Air Force increase appears smaller than might be expected, but this factors in a 9% CAGR decrease for hardware through 1999. All of the DoD components expect a 10–15% annual increase in leased voice circuits. Although hardware expenditures are decreasing or remaining flat in the services, DISA plans an increasing, but small amount of the total. Leased data circuits remain small (3–6%) portion of telecommunications expenditures, but much of funding in this category is

“hidden” in classified budgets. Professional and network services throughout DoD are in the 9-11% CAGR range.

DoD agency comments on telecommunications expenditures are much more pessimistic than their budget projections. This is probably due to the very high need for telecommunications products and services even outstripping the 9% CAGR projected by INPUT.

Both the Army and the Air Force commented that the transition to leased services from government owned and maintained systems would give the appearance of telecommunications growth, but it was not necessarily “real.” Many government-owned telecommunications systems, especially voice, are old and their costs are embedded in facility budgets, essentially unaccounted for as identifiable items.

Moving to leased services brings these expenditures out in the open and may decrease expenditures elsewhere. For telecommunications vendors, this is positive news. While circuitry and services may not be increasing for DoD itself, expenditures going to telecommunications providers will increase.

Several comments were also received from DoD sources about the importance of the “new world order.” As a driving force in telecommunications growth, the worldwide reach of peacetime actions by the military is very strong. Telecommunications expenditures requests attached to peacekeeping missions and preparation for such actions is a powerful budget justification. Additionally, the new 104th Congress is likely to push for added military expenditures with the associated need for higher telecommunications funding.

The Defense Department and GSA have agreed to a phased approach to using FTS 2000.

Initial focus will be on the department’s use of FTS 2000 for non-secure, direct dialing, WATS, and 800 services. Following the initial application of FTS 2000 the Defense Department will use FTS 2000 to meet non-secure data transmission needs.

- The Defense Department will not use FTS 2000 for communications requiring security.
- Some time will be required for the Defense Department to identify secure and non-secure data network needs, since they are currently integrated into the same networks.

By agreement with GSA, the Defense Department’s Defense Commercial Communications Organization (DECCO) will be the primary point of

interface for the acquisition of FTS 2000 services. Pending projects and funding requests clearly indicate the Defense Department's commitment to using telecommunications technology.

DoD expects to have completed the switch-over by March 1996, the expiration date of AT&T's DCTN contract. DoD also plans to phase out Autodin by 1999.

2. Civilian

Funding for civilian programs is under attack from many quarters, including the administration and the new Congress. Entitlement operations aside (which generate tremendous telecommunications requirements on a routine basis), major program growth is isolated to a few agencies, such as the Internal Revenue Service and the Federal Aviation Administration.

For telecommunications expenditures, however, these forces are not so limiting. Civilian agencies are projecting increased expenditures at the CAGR of 11% from 1994-1999. This represents slightly less than a doubling in funding to the end of the decade. In particular, INPUT analysis shows that spending in all telecommunications categories will rise.

- Increase for leased circuits at a CAGR of 12%
- Slight increase for hardware purchases at a CAGR of 3%
- Moderate increase for professional services at a CAGR of 8%
- Increase for network services at a CAGR of 12%

There are three major factors driving increases in civilian telecommunications:

- Telecommunications allows a smaller staff to operate more effectively
- Performance and interoperability requirements for operation of mission critical systems
- Linkage with state and local offices and governments for more efficient administrative operations

Significant variability exists across civilian agencies both in terms of budget projections and percentages of expenditures in the telecommunications categories. While DISA has the lion's share of DoD telecommunications funding, GSA accounts for only about 40% of current

civilian spending. For the planning period of this report, 1994–1999, the top seven civilian agencies have compound annual growth rates of:

- General Services Admin. 12%
- Energy 9%
- Health & Human Services 8%
- Justice 10%
- Transportation 14%
- Treasury 11%
- Veterans Affairs 8%

The GSA and HHS rates would be even high if not for significant decreases in hardware purchases. CAGRs in these two agencies for hardware are -10% and -5% respectively. The hardware category is for separate, identifiable hardware purchases; hardware may be purchased as a component of other contracts, for example systems integration.

In these top seven agencies, planned expenditures for leased data circuits average 4% CAGR, except Treasury which is 9%. Professional services range from 7– 9% CAGR. Network services are in the 10– 12% CAGR, except Transportation which is a substantial 17% per year.

3. Mission-Oriented

Mission-oriented telecommunications systems are where significant activity exists for federal agencies. They are the driving force of large integration contracts for computers and communications, as well as services. Mission-oriented telecommunications share some common characteristics, whether in civilian or defense agencies. These characteristics include speed, bandwidth and security.

Agencies surveyed by INPUT emphasized speed as the primary requirement for their mission-critical telecommunication needs. As will be described in the next section on technology, ATM and Sonet were the most desired future capabilities. Agencies dealing with high volumes of transaction processing, such as financial data and agencies dealing with satellite telemetry say that vendors with solutions for speed will meet requirements.

Closely associated with speed, is a strong requirement for bandwidth. As agencies move to include graphics and images in their data transmissions, bandwidth becomes a critical factor. In this arena,

agencies with previously limited need for high capacity networks are now finding additional requirements. These include electronic transmission of medical records, benefit/history files, and, of course, geographic information.

Security is obviously a concern with defense communications, but several civilian agencies appear frustrated by poor security in FTS 2000. When security becomes an issue, agencies opt for their own networks and the increased costs usually associated with them. This presents a real problem in today's budget environment. One civilian agency surveyed by INPUT specifically mentioned the benefit of DoD use of FTS 2000 as bringing additional pressure for security on GSA. A particular requirement in this area was a need for flexibility in applying protection modes to an agency's networks.

The National Aeronautics and Space Administration (NASA) and Treasury's Financial Management Service (FMS) are representative of civilian agencies requiring specialized mission-oriented telecommunications. NASA maintains two WANs, one for mission systems (managed by Goddard) and one for administration (managed by Marshall). NASA wants to create one virtual network by 1998, but feels constrained by FTS 2000 capabilities and limited by budget considerations. FMS is in a similar position with security concerns about protecting the government's financial data.

4. Administrative

Administrative requirements for telecommunications are often given "second class status" by agencies and vendors, but their importance is growing. The reasons given by agencies surveyed by INPUT include the increasing complexity of data transmitted—forms and images, for example. Agencies also mentioned the increased interaction between federal agencies and state/local organizations. This heightened awareness of administrative requirements leads to some common characteristics of telecommunications needs:

- interoperability
- flexibility
- integration

In surveying federal agencies, INPUT found that interoperability is a key requirement for administrative systems across military and civilian departments. This requirement comes from a variety of sources, including the existence of multiple telecommunication systems within an agency to connectivity with other federal agencies. Equally important is

the requirement for linkage with local agency offices and their state and local counterparts. Further, each of these entities has its own set of vendors, so that interoperability becomes not only a technical requirement, but an organizational one as well.

Flexibility also is a characteristic mentioned frequently by agencies. In a sense, this is the "other side of the coin" from interoperability. Interoperability allows flexible connectivity, but agencies are seeking more than compatibility. Flexibility means fitting the right products and services for the specific telecommunications requirement. That is, not a "one shoe fits all" approach.

Integration is the third major characteristic for administrative telecommunication needs. Agencies spoke of integration in service terms. Many agencies are hard pressed to high level technical support and management for administrative systems and thus need vendor support in these areas. This is increasingly true as agencies are establishing connectivity with other governments and organizations.

Interior, for example, plans use of FTS 2000, but mainly through DOI Net while integration of LANs has a top priority, mainly through integration services. HCFA found network management such an issue for claims processing that it will contract out for integration services. The Army, on the other hand, foresees very little work in this area because of a family of telecommunication standards that was adopted and implemented several years ago.

5. Preferred Acquisition Methods

With only a few exceptions, agencies have centralized planning and acquisition of telecommunications services within the agency's office of information resources management (OIRM). Although separate voice and data communications offices exist in some agencies, integration of these offices is the norm.

Agencies prefer to meet their telecommunications requirements in a variety of ways, as shown in Exhibit IV-1, many using more than one source of supply. Acquisition of integrated systems is the preferred method of acquiring services; however, for the majority of agencies this approach will only be used for acquiring agency-specific networks and services.

Exhibit IV-1

**Preferred Method for Acquiring
New or Improved Telecommunications**

Method	Preference Ranking	
	1990	1994
Buy Integrated Systems	1	1
Buy Common Carrier Services	2	5
Use GSA or DCA Services	3	4
Buy VAN Services	4	6
Hire Contractor to Integrate Agency Components	5	2
Buy Components and Integrate In-House	6	3

As reflected in other sections and discussed in Chapter VI, FTS 2000 is the method that agencies will use to meet the majority of their networking needs. In fact, acceptance of FTS 2000 as a viable method of meeting agency needs has been growing steadily.

Departments and agencies face the need for increasingly complex networks. With FTS 2000 a requirement for meeting most basic federal requirements, there is a growing need for professional and integration services to identify methods for connecting fragmented networks and systems.

Since 1990, an almost complete reversal has taken place in agency preferences for use of contractors for integration as opposed to common carrier or GSA services. This does not mean that FTS 2000 is not the preferred method for voice systems (or even data), but that agencies are using in-house staff and/or contractors to create their own networks with GSA circuitry.

B**Technology Trends****1. Voice and Data Services**

Voice service continues to dominate federal government telecommunications spending. This is not expected to change in the near future. However, as in the private sector, primary growth is expected in

network based services, with spending for voice services remaining constant or growing at only a modest rate.

Federal agency personnel believe voice services will increase over the next five years, as is shown in Exhibit IV-2, but many indicate a leveling off in expenditures. Those believing that expenditures will increase attributed the growth to increased demand from specialized services, such as agency use of 800 numbers and cellular.

Agencies that believe that spending for voice telecommunications services will decrease attributed the decrease primarily to the use of FTS 2000, believing that savings will offset any growth in use.

Agencies almost universally expect expenditures for leased circuits, networks, and software to increase. A modest percent expected them to remain the same. Overall, virtually none expects a decline, except in hardware. The responses are understandable. Networks (including hardware and software) to connect systems and operating sites will experience significant growth.

Exhibit IV-2

Federal Telecommunications Spending Directions

Product Category	Percent of Respondents Indicating Spending*		
	Increase	Decrease	Same
Voice	40	22	38
Leased Circuits	58	18	24
Networks	80	0	20
Hardware	13	70	17
Software	65	11	23

* Rows may not add to 100% due to rounding.

Agencies do anticipate significant changes in the mix of voice/data and analog/digital communications during the next five years, as shown in Exhibit IV-3.

Exhibit IV-3

Percentage Distribution of Telecommunications Traffic

	Current	Future (1999)
Voice	60	40
Data	40	60
Analog	70	45
Digital	30	55

From 1994 through 1999, data traffic will increase at a much greater rate than will voice traffic, with the relative proportions of voice and data traffic favoring data in the late 1990s. Some agencies also noted a requirement for higher data speed and increased accuracy in future communications networks. The growing popularity of facsimile equipment will also lead to more traffic.

Note that, in INPUT's previous report, the shift from voice to data and from analog to digital was projected to occur in the early 1990s. The transition has not occurred as quickly as anticipated due to the extended time necessary to accomplish selection of the vendors for FTS 2000 services. During the selection process, many changes were put on hold as agencies analyzed the services that would be available. However, the selection process has only delayed, not curtailed, the shift. With FTS 2000 now implemented, the shift in emphasis should begin to occur at a steady rate.

Growth in leased circuit and value-added network services is expected by nearly all agencies. However, most agencies are quick to note that the increases will be derived primarily from use of FTS 2000. With the exception of those that have agency-specific requirements, such as security, nearly all expect to use the leased circuit and value added network capabilities of FTS 2000.

Both hardware and software are expected to continue to grow. The growth in hardware has slowed considerably from 1990/92 with some exceptions, such as major replacements effort, for example at the Health Care Finance Administration (HCFA). The growth in software is expected primarily to support protocol conversion between older and newer data network services and to provide for local-area network services.

2. Network Management

Network management is one of the fastest growing and most important areas in telecommunications. Agencies indicate that nearly 55% of their agency-specific data networks are managed by in-house staff, and of those managing their own networks, over 75% use a centralized network management approach. The professional services component of network management, while remaining the largest category, will lag behind the other categories (hardware and software) in growth rates.

To date, federal departments have followed a path similar to that of the private sector in managing their network. Netview and Novell are the most common wide-area and local-area network management products. Currently, 30% of federal departments contract for wide-area network management, while only 15% contract for local-area network management.

As indicated in Exhibit IV-4, the need for end-to-end services and a lack of in-house staff technical expertise are the main reasons for considering network management services. This is being driven by increased network complexity and interconnection. Conversely, the availability of high quality network management tools, especially for LANs, is helping to reduce the necessity and cost of network management. There are other reasons that some agencies are not considering third-party network management.

Exhibit IV-4

Agency Consideration of Third-Party Network Management

Considered Third-Party Management?	Percent of Respondents	Reasons*
Yes	55	<ul style="list-style-type: none"> • Want end-to-end services • Lack of technical expertise
No	45	<ul style="list-style-type: none"> • Violates security requirements • Not necessary • High cost • Must use FTS 2000

* Not ranked by order of importance

- Growing use of FTS 2000 reduces the need for major considerations of contracted network management. Agencies have an expectation that FTS 2000 will provide the degree of management necessary to meet their needs.

- Security requirements continue to dominate the concerns of many agencies. This domination is not expected to change in the near future and could increase. Agencies believe that security requirements necessitate that they retain management control over their networks.
- Some telecommunications and network management will be purchased through system integration and systems operations contracts.

Advanced agencies, such as NASA, are planning for the use of network “manager of managers” (MOM) concept.

3. Local-Area Networks

Of the agencies surveyed by INPUT, all are expecting significant growth in LANs and many are expecting a doubling in the number of installed systems. This does not translate to actual procurements, since the number of individual contracts for LANs continues to decline. This does not represent a decrease in the installation of new LANs but rather a change in how these procurements are identified and executed. As LAN procurements become more common, they become more difficult to identify. Some of the changes are as follows:

- Integrated procurements where the LAN is only a small part of the entire program. For example, several major office automation projects will use LANs but the LAN is not separately identified.
- An agency can purchase low volumes of LAN hardware and software from GSA schedules and professional services for installation and support from Basic Ordering Agreements.
- Many current procurements are replications of established and proven systems being expanded to multiple sites. These systems will be installed using the current vendors.

With more than 90% of agencies currently using local-area networks to some extent, emphasis is shifting toward projects to integrate networks that have already been installed. Over the next five years, agencies expect that more than 85% of their local-area networks will be integrated.

Integration methods vary considerably, depending on the agency. Agencies whose activities are highly centralized plan to implement building and campus-wide network structures. Those that are geographically dispersed expect to be able to link local (office) networks to FTS 2000 to achieve a national integrated network capability.

4. Network Integration

Federal agencies consider network integration to be very important, as opposed to having average importance in the 1992 survey. The intensity and nature of integration efforts vary among agencies. For some agencies, network integration will focus on merging voice, data, and other modes into one network, while many agencies view it as linking LAN-to-LAN and LAN-to-WAN. In either case, significant activity is projected.

As shown in Exhibit IV-5, agency representatives consider integrated network services to be fairly important (4.2 out of 5 on the scale) and over 82% have plans for comprehensive network integration projects of some variety. This ranking would be even higher if two of the agencies interviewed had not indicated that their integration efforts were almost complete.

Exhibit IV-5

Agency Use of Integrated Network Services

Average Importance Rating*	Percent Planning Network Integration through FY 1995
4.16	82.5

* 1-5 scale, where 5 = very important and 1 = not important at all

This brings federal agencies more in line with the plans of private sector organizations in rating integrated networks as very important. INPUT believes that federal agencies will look to FTS 2000 as the primary means of accomplishing network integration of voice, data, and other modes. Although agencies believe that FTS 2000 will be able to meet the majority of their needs in this area, ISDN may or may not be the specific solution.

5. Satellites and VSATs

Neither VSAT nor the capabilities of large satellite systems hold a great deal of interest for federal agencies. Although 49% of the agencies indicate that they are currently using some type of satellite service and 38% have considered VSAT services, most satellite services are used as backup to terrestrial networks. As indicated in Exhibit IV-6, the importance of satellite services to meet agency network needs by 1999 is considered to be of less than average importance.

Exhibit IV-6

Importance of VSATs and Satellite Systems

System Type	Average Importance by 1999	Rating Explanation
Satellite	3.1	<ul style="list-style-type: none"> • Little or no requirement
VSAT	2.3	<ul style="list-style-type: none"> • Little or no requirement • Low-cost solution • Effective data distribution

6. Wireless Communications

Cellular communications are viewed as having limited application in meeting most agency telecommunication needs. They are generally considered costly and have only limited functionality when considering overall agency needs. However, the requirement for cellular support, be it wireless LAN, mobile, or voice is very application specific. For example, half the agencies surveyed rated wireless not important and the other half rated it moderate to significantly important; there was no middle ground.

7. ATM, Sonet, and ISDN

Characterized by some as a technology waiting to emerge or a technological Catch-22, ISDN is being watched carefully by nearly all federal agencies and departments. However, interest is beginning to wane as newer technologies, such as ATM and Sonet, emerge.

Federal agencies recognize that with its ability to integrate voice, data, text, and image into a single transmission medium, ISDN provides significant opportunity to improve their operations and, potentially, reduce costs. They also recognize that a lack of standards results in a Catch-22, where the wide variety of equipment will frequently not work with ISDN-based equipment.

ATM received the highest ranking in technologies of interest in this INPUT survey with a score of 4.8, followed by Sonet with 4.1. Closely behind were T1 and T3 circuits, including fractionals.

For the rate of growth to increase, vendors will need to be able to identify specific sets of services and ensure compatibility of the equipment needed to deliver the services. To date, vendors have not been able to identify

specific services for which there is an overriding need to commit to ISDN and agencies are beginning to shift their sights to ATM and Sonet.

C

Network Service Trends

1. E-mail and Electronic Commerce

Agencies consider network services such as electronic mail (E-mail) and electronic commerce (EC) to be of high importance. Electronic commerce includes electronic document (or data) interchange (EDI).

Agencies recognize the value of electronic mail and plan to use this FTS 2000 service at the earliest possible time. Overall, agencies that need to interact with offices around the country consider E-mail to be of very high importance. Those with activities concentrated in a single geographic area consider the service important, but not to the same extent as agencies that are nationally dispersed.

Electronic data interchange is also of high importance to many federal agencies. EDI received the highest rating from those agencies that interact financially with the private sector. Average ratings for E-mail and EDI services are shown in Exhibit IV-7.

Exhibit IV-7

Agency Importance Ratings of Network Applications, 1994-1999

Application	Average Rating*
Electronic Mail	4.1
EDI/EFT	4.3

* 1-5 scale, where 5 = very important and 1 = not important at all.

Note should be made that agencies that have a high degree of financial interaction with the public consider EDI to be of greater importance. While they are waiting for standards to become more settled, agencies are expected to have high interest in EDI services.

2. Other Network Service Areas

Security and privacy gathered more interest among INPUT-surveyed agencies than even EC/EDI/EFT-type applications with a rating of 4.7. Other areas, such as desktop videoconferencing and directory services received average to above average interest. Many other services, such as international connectivity, kiosk support, and telecommuting support

were mixed, depending on specific agency plans. No common interest was found in these areas.

D

Agency Perspectives

INPUT asked agency officials their views on major non-technical impacts on federal telecommunications. Agency officials also provided suggestions for improvements that vendors could make in telecommunications systems and services to increase their value to the government.

1. Non-technical Impacts

Most agency officials felt that legislative and regulatory policies will continue to influence their plans and acquisitions for the foreseeable future. Agencies cannot predict the timing or effects of additional FCC and OMB actions and consequently encounter difficulty in forecasting telecommunications costs and acquisition schedules. Government-wide or agency-wide telecommunications programs need to reflect agency telecommunication needs and be supportive of these needs.

Every agency expressed concern over congressional budget actions to counteract the rising federal deficit. In general, agencies with security or emergency-preparedness missions felt less threatened by budget cuts. In periods of budget reduction, use of telecommunications facilities, such as teleconferencing, gains favor as a cost-effective alternative to travel. FIRMR Bulletin 16, Travel by Federal Telecommunications System, substantiates this view.

Reductions in the DoD budget would force some reallocation of telecommunications funds. In most cases, strategic and tactical systems receive priority. However, base communications modernization programs lose funding or are deferred to later years.

2. Telecommunications Use Effectiveness

Agencies consider their effectiveness in using telecommunications products and services to be average. This rating is not dissimilar to that of the private sector. However, the reasons for not making greater use of telecommunications to meet organizational needs are somewhat different from those in the private sector.

- In INPUT's survey, agencies rated the need for products and services such as local-area networks and electronic mail very highly. This reflects a need for telecommunications-based technologies. They also consistently noted a need to integrate local-area networks and to provide network interoperability.

- The follow-on contract for FTS 2000 provides for a wide range of services and features. The ability to add the latest products and services to FTS 2000 suggests a need to make use of current telecommunications technology.
- The fact that use of FTS 2000 is mandated, except in specific cases, suggests that most agencies will meet the majority of their needs through FTS 2000. Most agencies believe that FTS 2000 will meet the majority of their needs.

With these considerations in mind, INPUT believes that agencies do have a need for telecommunications technologies. Agencies' responses therefore indicate that they do not have needs beyond the features and services that will be readily available to them.

INPUT also believes that federal agencies would make greater use of telecommunications technology if products and services were integrated and provided the necessary degree of interoperability.

3. Driving Forces

Federal agencies identify a number of driving forces that will affect, from their perspective, the telecommunications market over the next five years, as shown in Exhibit IV-8.

- Political and administrative factors, including budgets, are now the most significant driving force behind the use of telecommunications. Agencies believe that budget cuts that force integration, the public's desire for access to government information, and the world political situation drive telecommunications as much as technology and price.
- Technological advancement is the second most frequently mentioned force behind greater use of telecommunications. Advances that agencies believe will contribute to the greatest growth are LAN internetworking products and electronic mail services. Network management tools are also important.
- Price reductions and needs to distribute data are rated nearly equally. Agencies believe that costs will continue to come down, driving telecommunications use as an alternative to face-to-face meetings. The need to disseminate data will also contribute to increased telecommunications use.

Exhibit IV-8**Driving Forces**

- Public Access to Government Information
- Interagency Sharing and the Use of Internet
- Audits to Assure Proper Dollar Value for Service
- International Political and Military Situation
- Cross-Network Security
- Availability of Inexpensive Technology
- Budget Cuts Forcing Systems Integration

4. Inhibiting Factors

Although technology advances and declining prices will stimulate increased use of telecommunications, the political environment and security considerations will have both positive and negative inhibiting effects. As shown in Exhibit IV-9, these factors are prominent in the list of negative factors affecting the use of telecommunications.

Exhibit IV-9**Inhibiting Factors**

- Budget Cuts Forcing Use of Legacy Networks
- International Political Situation Forcing Funds to Military Hardware
- Mandated Use of Specific Services
- Limited Flexibility in Contract Vehicles
- Political Considerations

When considering political relations, agencies are generally referring to the ability of the legislative and executive branches of government to reach agreement on budgets and funding levels.

Growing concerns about security will have an inhibiting effect on investment in new telecommunications services. Agencies and departments with high security requirements will not make major investments unless they can obtain significantly enhanced security capabilities.

5. Vendor Weaknesses

Lack of knowledgeable personnel and a low level of support lead the list of vendor weaknesses. Agencies believe that vendors have only one interest: sale of a specific product, as shown in Exhibit IV-10.

Exhibit IV-10

Vendor Weaknesses

Weaknesses	Percent of Respondents
Low support/service levels	30
Lack of knowledgeable personnel	20
Proprietary systems	20
Volume-sensitive pricing	10
Inadequate technology	10
Business attitude	10

Federal agencies express interest in trends and directions in the telecommunications industry. Agencies have little interest in dealing with vendors who have knowledge of only one product or product line or who have little knowledge about how the federal procurement process works. A consistent theme of the interviews with agencies is that agencies are continually having to educate vendors in federal processes and practices.

Agencies express little satisfaction with the after-sales support provided by most vendors. Results of interviews indicate clearly that vendors that provide consistent, high-quality after-sales support will be viewed more favorably than other vendors.

6. Agency Recommendations to Vendors

One of the most frequent observations made by agencies contacted is that vendors should improve their image with federal officials through better pre- and post-sales support. Agency officials frequently commented on vendor-buyer business relationships. Vendors are too opportunity-oriented and only concerned with making the next sale.

To most agency representatives, after-sales support is more critical than sales or implementation support. While sales and implementation support is important, support that provides ongoing education and

ensures industry awareness represents a higher value to agency respondents.

Closely aligned with support is the need for education and training. With a less technically knowledgeable staff, continuing training programs are necessary. In addition, the federal procurement process insulates many decision makers from the latest technology. Education is necessary to ensure that program managers and policy makers are aware of technology that is available.

In addition to these recommendations, summarized in Exhibit IV-11, agencies frequently mentioned other recommendations.

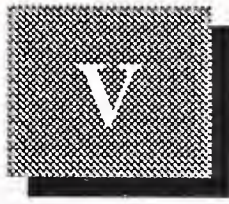
Exhibit IV-11

Agency Recommendations to Vendors

- Adhere to National/International Standards
- Create and Sell Truly Interoperable Products
- Enhance Follow-up to Trouble Reports
- Increase "Survival" (Disaster) Planning
- Sell Solutions, Not Equipment
- Maintain Technical Skills of Contractors
- Provide Higher Quality Service in Billing, Configuration Data, and Service Restoration
- Become Familiar with Agency Applications
- Increase Knowledge of Multinetwork Protocols
- Enhance Performance Measurements

Most agencies want vendors to work toward and support common telecommunications standards, be they TCP/IP, OSI, or agency-based. Vendors should address the government's protracted problems with system interconnection and interoperability by supplying compatible hardware architecture and communications protocols. In most cases, however, this is incompatible with the vendors' marketing thrusts.

To summarize, as commented by one high level official: "The days of trust me are over! Vendors must demonstrate solid, measurable value-added service to get and retain contracts."



FTS 2000 Follow-On

In preparation for post-FTS 2000 transition, the General Services Administration conducted an overall assessment of agency trends that might effect telecommunications. Among their findings for a ten-year and beyond time frame were:

- Agency missions will be stable, but the means of accomplishing them may radically change.
- Agency communities of interest (with which they are most likely to establish communications), are primarily external to the federal government, ranging from local governments to hospitals, educational institutions, law enforcement, and directly to the citizen.
- Applications emphasizing service to the citizen, electronic commerce, telemedicine, teletraining, and shared databases will be important.
- Building client/server applications will increase telecommunications needs as will connectivity of existing systems.
- Centralized contract administration will accelerate, while most telecommunications needs will be met through commercially available products and services.
- Growth in dedicated circuits will grow two to three times as fast as low-speed services, while SVS will expand into new areas (e.g., international) and SDS will grow over 20% per year.

GSA estimates the current 4.5 billion minutes per year handled by FTS will grow to 7 billion by 1999 after starting at 1.2 billion in 1988. These findings, plus the question of how to deal with DoD requirements, are fueling the discussion of what a post-FTS 2000 telecommunications system should look like. The next three sections elaborate these areas: GSA/DoD System Consolidation, the Post-FTS 2000 Scenarios, and Agency Perceptions of FTS 2000.

A

GSA/DoD System Consolidation

GSA and DISA are simultaneously faced with the issues involving moving their telecommunications systems into the 21st century. A Joint Concept Review Committee, composed of senior executives from GSA, DISA, and leading departments, concluded that no single issue, or combination of issues, involved in the consolidation of FTS 2000, DISN, and GETS (the Government Emergency Telecommunications Service) would render the proposed merge infeasible or unworkable. On this basis, and with other political considerations, the merger is being planned. Some of the committee's other findings are also instructive for telecommunication trends:

- Three key goals emerged from agency interviews:
 - Minimize complexity of management and oversight
 - Maintain aggressive competition
 - Assure system and service interoperability
- A consolidated system represents significant progress toward establishing a Government Information Infrastructure as advocated by the NPR
- Cost Savings will be:
 - Unlikely for additional voice traffic volume, but DoD should save
 - Likely for consolidation of data services for all users
 - Mixed for administrative components
 - Mixed local access, depending on location

With respect to national security and emergency preparedness issues, no roadblocks were uncovered. However, significant considerations, and likely costs, would have to be addressed by a post-FTS 2000 system to provide preemptive capabilities for DoD command and control and special overseas features for voice. Data communications were given a similar qualified endorsement.

INPUT's interviews with Air Force and Army program manager level personnel solicited a somewhat different view. Individuals in these services expressed significant doubt that any DoD international voice or data usage over a post-FTS 2000 system would be feasible. Two reasons

were cited. In many less developed nations the telecommunications infrastructure is insufficiently developed to support military actions; Haiti was given as an example. Even in developed countries, such as in Western Europe and Japan, the national voice, if not data, systems are controlled by governmental PTT's. Even though many of these countries contract to AT&T, or other providers, for services, ultimate control is still governmental. The interviewed military officers found this unacceptable.

B

Post-FTS 2000 Scenarios

Scenarios for the post-FTS 2000 environment abound depending on who is expressing opinions. INPUT has reviewed GSA documentation on the subject and interviewed the Assistant Commissioner for FTS 2000 and the deputy director.

GSA has identified three types of approaches to the acquisition of post-FTS 2000 telecommunications services, with eight potential contracting alternatives.

- Each Contractor Provides a Comprehensive Range of Services
 1. Continue Current Comprehensive Contracts
 2. Obtain an Integration Contractor
- Partition Services into Families of Contracts
 3. Create Span-Specific Contracts
 4. Create Regional Comprehensive Contracts
 5. Establish Integrated Business Process Solutions, Using Commodity Contracts
 6. Develop Service-Specific Contract
 7. Develop Service/Span-Specific Contracts
- Individual Agency Acquisitions
 8. Allow Individual Agency Acquisitions

GSA officials say elements from all of these acquisition alternatives may be in the final approach that is selected.

The FTS 2000 Program has established some guiding principles that will drive the acquisition strategy:

- A Competitive Environment Will Replace the Current Mandatory Use

GSA emphasizes that the operative word is "environment." This means that within the competitive environment, some mandatory use may still be required. Stable technologies with high use, for example, may be competed, while new services just being adopted might be mandatory.

- Commercial Services Will be Used in Every Way Possible

Commercial services are the vehicle of choice for obtaining telecommunications needs. For most administrative and many mission-oriented requirements (see chapter IV), off-the-shelf products and services will meet needs. For others, such as military uses or certain high-speed/bandwidth processing applications, agency-specific networks may be needed.

- Agencies Want Engineering Support through GSA Directly or from the Post-FTS 2000 Contractor(s)

Many agencies want to "get out of engineering," as one executive states and are "throwing it to GSA or an integrator" to handle. GSA, in fact, according to FTS 2000 officials wants to be a major integrator and premier supplier of telecommunications services. Their major concern is training and maintaining skilled staff.

- Post-FTS 2000 Will Not Take Over DISN

GSA and DoD will "share common business interests." Both will leverage the government position on whichever organization does the best job. Through an interagency task force, FTS/DISN issues will be resolved and management strategy established. FTS 2000 will "not go to the tank," but on the other hand many DoD administrative telecommunication requirements can be met efficiently and effectively through GSA-provided services.

- Multiple Services and Multiple Contracts Are a Distinct Possibility

No assumption is being made about a single (or two) contracts or that only a single mode of service (such as voice only) will be offered. A "robust program that covers most of the government's telecommunications needs will almost certainly involve multiple contracts and services, and eventually end-to-end."

GSA's schedule for post-FTS 2000 is only known in the most general terms. Agency officials refuse to comment on "RFP-type details," but certain targets are available:

- 1993/94 Strategy and Requirements Analysis
- Mid-1995 First Request for Information
- Late 1995 Request for Proposals
- Late 1996 Contract(s) Award
- 1997/98 Implementation and Transition Planning
- 1999 Phased Implementation

GSA "does not plan to all of a sudden drop current services and plug in the new, but current services will not be allowed to linger on for an extended time." The agency hopes that the post-FTS 2000 services and prices will be attractive enough to lure agencies to it without "a stick."

Other GSA comments are also instructive of the post-FTS 2000 environment. The states and local governments have expressed interest in the GSA procurement, but the agency will "keep them at arms length." Although states represent \$50 billion in systems and telecommunications spending, the requirements and regulations of 50 separate entities are "too much to handle" on top of federal needs.

With former Congressman Jack Brooks gone, GSA staff expect "more debates and more issues" than before. One of their biggest concerns, however, seems to be training. "Politics will take care of itself," but the "continuing education of the staff here and in the agencies has us worried."

C

Agency Perceptions of Current and Future FTS 2000 Services

Federal agencies directly interviewed and indirectly evaluated through plans and articles are generally very positive about FTS 2000. Initial hesitations and doubts about the program have been replaced with approval in three areas:

- Basic Services

Agencies are positive about voice services, but much less enamored with other FTS 2000 offerings (see Exhibit V-1)

- Contract Management

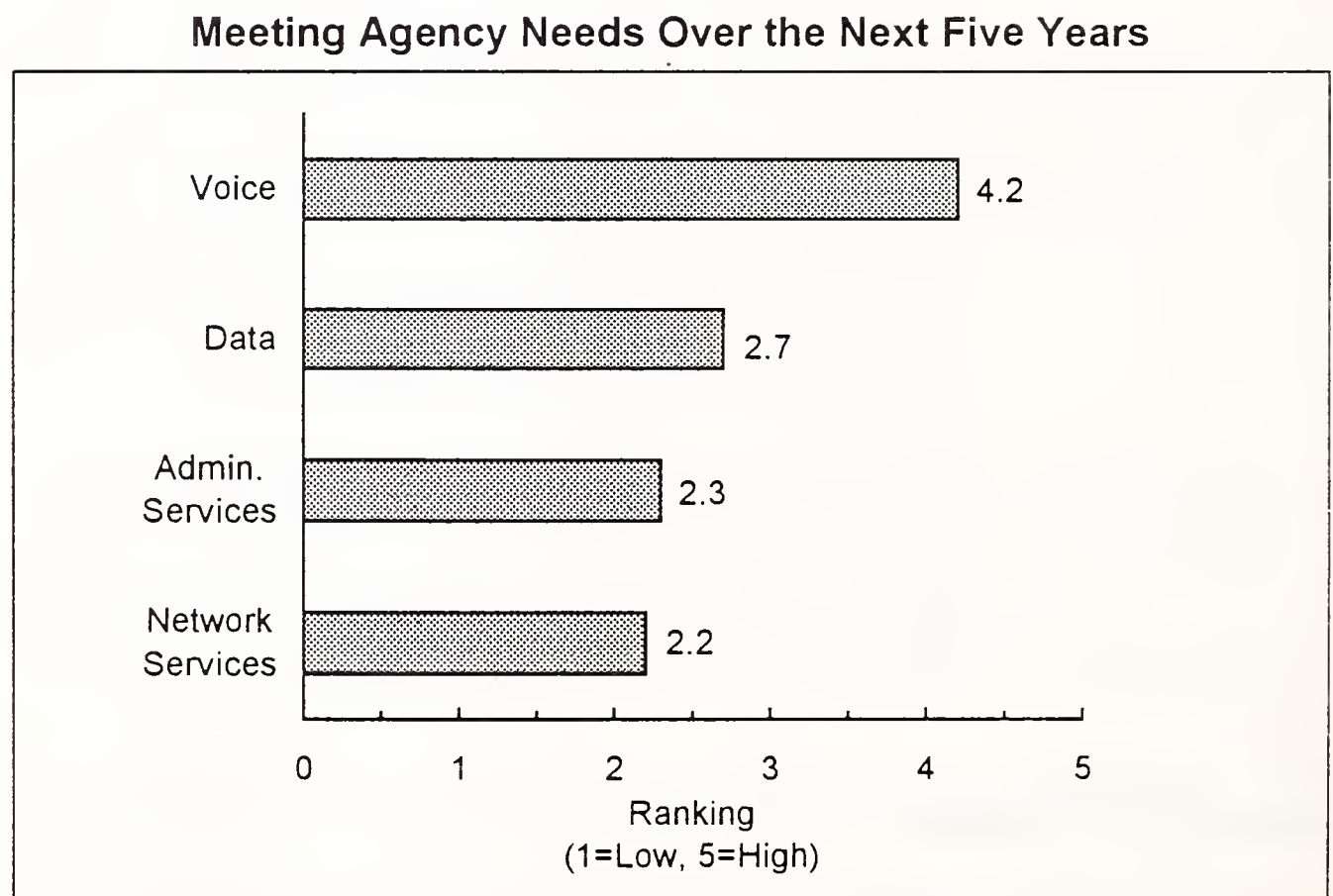
Several agencies expressed "relief" that the burdens of contract management, especially price negotiations and administration, were GSA's responsibility, not theirs.

- Standardized Services

Many agencies appreciate the fact that services offered by FTS 2000 are consistent and standardized across the government. It "allows us to concentrate on issues of technical substance in dealing with other agencies and vendors, not basic connectivity problems."

In response to INPUT's questions on how well FTS 2000 will meet agency needs over the next five years, interviewers ranked the program in four categories as shown in Exhibit V-1.

Exhibit V-1



Comments on this question followed the quantitative rankings. FTS 2000 technology and service best supporting the agencies were voice and "long distance phone." Those technologies and services least supportive of agencies included packet switching, network services, data communications, high speed data transmission, and administrative services. Leading edge agencies were especially critical of network services saying that "if they [FTS vendors] weren't going to do a good job with applications, such as E-mail, they shouldn't even be in the business."

The top technologies desired by agencies from post-FTS 2000 services included ATM (number one choice) and high speed data (number two choice). Other preferences included distributed processing, satellite, frame relay, high quality video teleconferencing, international, Sonet, multimedia and wireless PC/LANs.

On post-FTS 2000 acquisition strategies, agency representatives had several comments.

- FTS 2000/DISN Merger

- Positive: May help reduce costs for basic services
DoD will help us push security needs
Economies of scale will be achieved
- Negative: Limits flexibility
Consolidates and locks into old technology
Security will be diluted

- Mandatory Usage

- Positive: Could reduce costs
Will not work without some mandatory
Will help program integrity
May enhance interoperability
- Negative: Eliminates flexibility
Only if limited to certain services

Multiple awards were unanimously viewed as positive in promoting competition, responsiveness and managing technologies across the life cycle.

D

Conclusions

The variety of agency perceptions on post-FTS 2000 requirements and technologies can be summarized into a few categories.

- Telecommunications Technology Will Continue to be Dynamic

Technologies are being added to FTS 2000 and brought to the market at an increasing pace. ATM and Sonet being added to FTS 2000 offerings from AT&T and Sprint is working on a proposal for those technologies

for the end of 1995. In the next few years, agencies expect orders of magnitude increases in bandwidth, video dial tones, and mobile personal telephone numbers.

- The Telecommunications Market Will Continue to be Dynamic

Almost complete deregulation of the local access market is likely in the time period under consideration (1994-1999). The ramifications are expected to be as large, if not larger, than the original breakup of AT&T.

- Price Competition Needs to be Balanced With Contract Management

Agencies are very concerned about getting competitive prices on telecommunications services, but are also concerned about the poor performance in administrative support under the current FTS 2000 system.

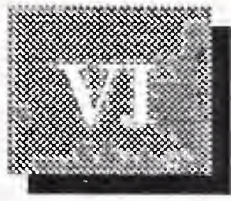
- Requirements Are Broad and Often Ill-Defined

Post FTS-2000 products and services must address a very wide variety of requirements from high speed, high bandwidth to remote access and application flexibility. Although agencies are relatively certain about mission stability, they are uncertain about the means and conditions under which the mission will be accomplished; again, agencies want flexibility.

- Interoperability and Performance Are Key Issues

The two words most often spoken by agencies in regard to post-FTS 2000 technology are interoperability and performance. The former encompasses both voice and data, as well as local and long distance service. The latter includes both speed and bandwidth, which agencies want "on demand."

While expressing diverse views on agency-specific needs, government telecommunications executives share a common vision of how the post-FTS 2000 environment should support them: solid support for the basics and flexibility in unique agency requirements.



Competitive Trends

Competitive trends for telecommunications equipment and services in the federal marketplace have a common characteristic with other information technology components: they are often hidden and disguised in many places. INPUT has conducted analysis of contracts, pre-award solicitations and budget requests to isolate opportunities in the telecommunications market. Sections A and B, Marketplace and Federal Telecommunications Vendors, present the findings. Sections C and D, Vendor Market Plans and Vendor Concerns, are the results of INPUT's survey of selected telecommunications vendors.

A

The Marketplace

The federal marketplace for telecommunications is divided into four segments: circuits, hardware products, network services, and professional services. Definitions of these segments were discussed in chapter II-B, however, a reminder—hardware includes software that is purchased with equipment.

1. Telecommunication Segments

Circuit contracts and pre-award opportunities are fairly evenly spread across federal departments, with a few exceptions. The typical department has one or two contracts, while big users such as Transportation, Justice and DISA have six to nine.

Exhibit VI-1 presents the government-wide totals for telecommunications market segments.

Hardware (and loaded software) is distributed across departments similar to circuits with the same high use departments. In fact, with some minor variation, if a circuit contract exists, hardware purchase is also very likely to be in place, and vice versa.

Network service contracts and opportunities, however, are much less prevalent and concentrated in fewer departments, such as Health and Human Services and the military services.

Professional services, on the other hand, are common in almost all departments and in multiple numbers. The major use departments have eight to thirteen contracts or opportunities each.

Exhibit VI-1

Telecommunications Opportunities by Segment

•	Circuits	70
•	Hardware	77
•	Network Services	44
•	Professional Services	104

2. Agency Opportunity Overview

Of the 294 total telecommunications contracts and opportunities identified by INPUT, civilian agencies account for 61%. Exhibit VI-2 presents civilian and defense numbers by market segment.

As previously mentioned, a few departments account for a large share of civilian telecommunications opportunities. Four departments: Health and Human Services, Justice, Transportation, and Treasury, account for 54% of these contracts and opportunities.

Even within departments, opportunities are concentrated in a few agencies. For example, the Federal Aviation Administration accounts for most of Transportation's telecommunications potential. Concentration also exists within segments by department. Within Health and Human Services, planned circuit and hardware purchases account for most of the department's activity, and many of those are in the Health Care Finance Administration.

Exhibit VI-2

Civilian and Defense Opportunities by Segment

	Circuits	Hardware	Network Services	Professional Services
Civilian	48	48	22	60
Defense	22	29	22	44

Opportunities in the Defense department are much more evenly spread than in civilian departments. DISA and the Navy account for about 30% each while the Army and the Air Force control about 20% each. In DoD, about 37% of the opportunities are in professional services with the other segments fairly evenly divided.

B

Federal Telecommunication Vendors (Non-FTS 2000)

This section highlights the federal telecommunications market for non-FTS contract spending. Although some of these contracts may be in support of FTS 2000, they are not a part of those GSA contracts.

Total spending in the market, from the agency budget perspective, has been described in chapters III and IV. This section views the market from the vendor perspective. INPUT has identified over 175 major telecommunications contracts and the vendors who are prime recipients.

The market, like the overall information technology market, is highly concentrated and fragmented at the same time. This means that a few companies control most of the market with some very large contracts. However, many companies are in the market with small contracts. In fact, of the large companies, most of their market presence is from very large single contracts. The small companies are usually supported by only one or two small contracts.

Exhibit VI-3 displays the results of INPUT's analysis of the market. EDS is the market leader, by a wide margin with 16.2%. The other major companies have market shares that range from around two to seven per cent. Large telecommunications companies, such as Harris, I-Net, and BDS only hold less than 2% each. The remainder of the market is made up of many smaller contracts, usually \$5-15 million.

Exhibit VI-3

Market Share for Non-FTS 2000 Federal Telecommunications Vendors

Company	Market Share
EDS	16.2%
Hughes	6.7%
GTSI	5.3%
IBM	5.2%
Bell Atlantic	5.2%
GTE	5.2%
Martin Marietta	4.7%
HFSI	4.4%
TRW	3.9%
CSC	3.7%
Grumman	3.0%
Unisys	2.9%
Nortel	2.7%
PRC	2.2%

The top 14 companies, as shown in Exhibit VI-3, control 71.3% of the market. The remaining 28.7% is controlled by many companies, but even that is concentrated in ten large companies, such as AT&T and SAIC. The small telecommunications companies hold a lot of contracts, but for a very small share of the market. The top seven vendors, for example, hold almost half (48.5%) of the market share.

Again, even the largest companies, with the exception of EDS, usually rely on a single large contract with perhaps several other small contracts. Hughes, for example, scores its number two position mainly on its NASA contract and GTSI its number three position on its Navy contract.

C

Vendor Federal Telecommunications Market Plans

This section examines the factors that can affect the success of a vendor in the federal telecommunications market.

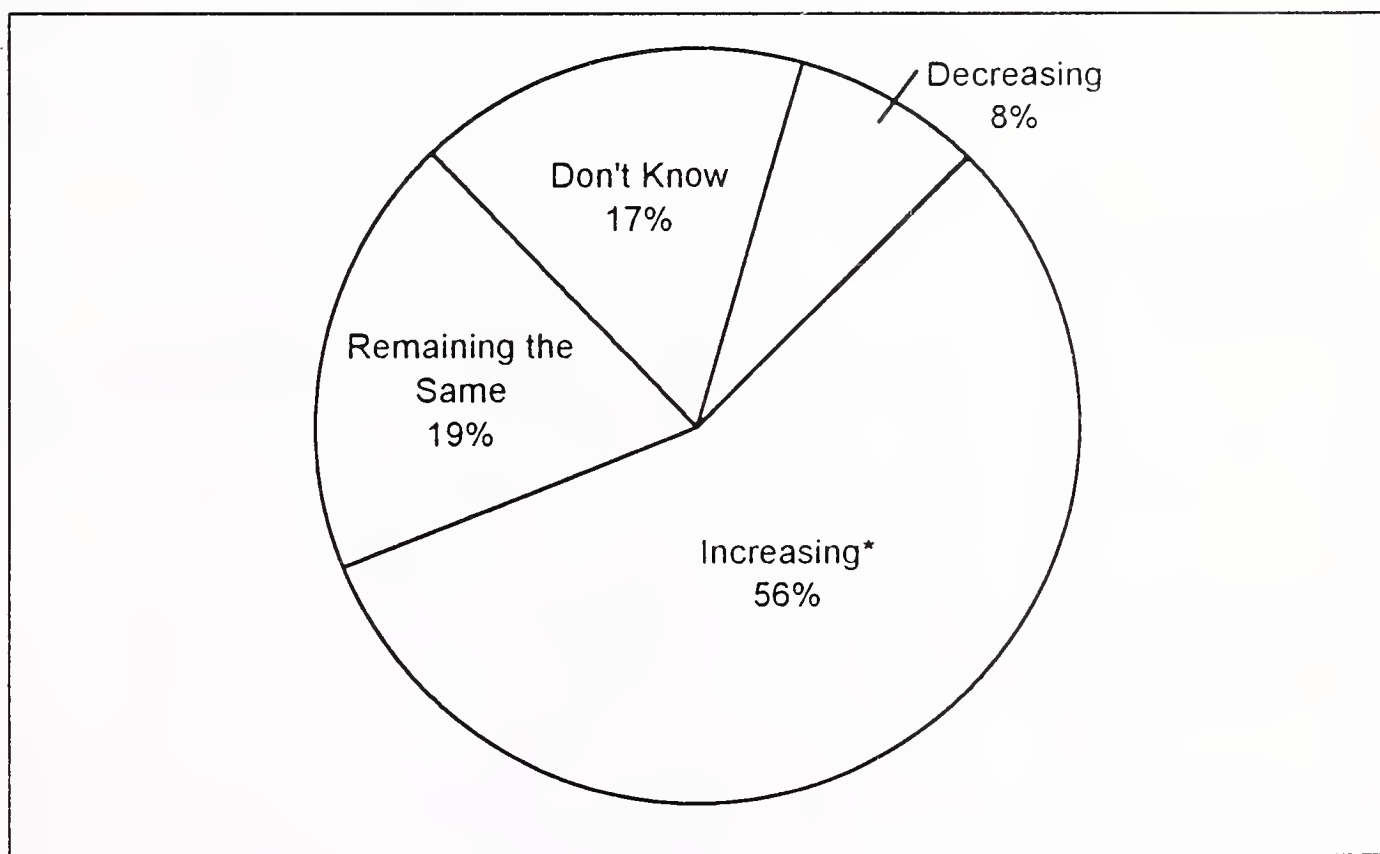
1. Market Direction

The market for telecommunications services will continue to grow. As shown in Exhibit VI-4, 56% of vendors believe that the market for telecommunications services continues to grow. Only 8% think that it will decline; however, an increasing number, 17% (up from 8% in 1992) respond, "don't know."

The rate of growth is open to question. Agencies are generally not able to predict the rate of growth. Vendors believe that the market will grow at 16% for the next several years. Though agencies were not able to identify a specific growth rate, they believe that the primary growth will occur in several areas. Budget growth, as discussed in chapter III is projected at slightly less than 10%, significantly less than vendor estimates.

Exhibit VI-4

**Vendor Perception of Federal Telecommunications
Market Directions**



* Average increase indicated: 16%

- 40% of the agencies believe that spending for voice services will increase. A slightly smaller number (37%) believe that spending for voice services will decrease. The remainder believe there will be no change.
- 68% of the agencies believe that spending for leased circuits will increase. Only 18% believe that spending will decrease.

- 80% of the agencies believe that spending for network services will increase. None thinks that spending for network services will decrease. The primary requirement for network services is for electronic mail. On a scale of 1-5, with 1 being low, users rate the importance of electronic mail at 4.1, suggesting that electronic text communication is important to nearly all agencies.
- 70% of the agencies believe that spending for hardware will decrease. Only 13% believe it will increase.
- 65% of the agencies believe that spending for software will increase. Only 11% think that spending will decrease.

2. Growth Factors

There are several factors that will cause growth in the federal market for telecommunications. Vendors identified eight different factors that they believe will cause the market to grow. Of the eight factors, specific agency requirements was the most frequently mentioned, by a considerable degree. As shown in Exhibit VI-5, overall growth in network use, the availability of new technology, and integration and interoperability were perceived by vendors as considerably less important. New for 1994, is a perception among vendors that government downsizing will stimulate telecommunications market growth by increasing the need for connectivity.

Exhibit VI-5

Vendor Perceptions of Market Growth Factors

Market Drivers	Percent of Responses*
Specific Agency Requirements	40
Government Downsizing	23
Increasing Network Use	15
New Technology Availability	15
Interoperability and Integration	15
General Automation Increases	7
Aging Equipment Upgrades	7
Cost Decreases	7

* Does not add to 100%, multiple responses allowed.

3. Agency Opportunities

As vendors consider opportunities for telecommunications products and services within the federal government, the Department of Defense continues to head the list as offering the greatest opportunities. While vendors rate civilian agency opportunities comparably, there are a greater number of civilian agencies. Exhibit VI-6 summarizes vendors' perceptions of the departments and agencies that offer the greatest opportunities.

Exhibit VI-6

Agencies Offering the Most Telecommunications Opportunities

Agencies	Percent of Responses*
Civilian	40
Defense	35
Transportation/FAA	25
Treasury	15
Security/Intelligence	15
U.S. Postal Service	15
Navy	15
GSA	10
Army	10
Air Force	10
HHS	10
Energy	10
Agriculture	5
NASA	5
Justice	5
EPA	5

* Does not add to 100%, multiple responses allowed.

4. Preferred Acquisition Methods

As shown in Exhibit VI-7, there is considerable difference of opinion between vendors and agencies about the preferred method of acquiring telecommunications services. (Responses for this exhibit resulted from a question about the preferred method of acquiring telecommunications services—if they had free choice. The requirement to use FTS 2000 was noted to respondents. They were asked to provide their opinions, assuming that use of FTS 2000 was not a requirement.)

Exhibit VI-7

Vendor Perceptions of Agency Preference for Acquiring Telecommunications Systems and Services

Acquisition Preference	Ranking*	
	Vendor	Agency
Buy Integrated Systems	1	1
Buy Common Carrier-Provided Services	2	5
Buy VAN Services	3	6
Use GSA or DISA Facilities	4	4
Vendor Integrate Agency-Bought Components	5	2
Agency Buys Components and Integrates In-House	6	3

* Rank based on average ratings by respondents.

From the responses, several points become clear. Vendors and agencies agree that buying integrated systems would be the preferred method of meeting agency needs, if agencies had a free choice. Though vendors and agencies agree on the most desirable methods of acquisition, there is considerable difference of opinion about other options, except a modest endorsement of GSA/DISA vehicles.

The ranking suggests that vendors think buying services from common carriers and value-added network service providers is a preferred method while agencies do not. Agencies now accept (demand) basic service from GSA/DISA and are looking for development, integration, and management support from telecommunications vendors for agency networks and unique requirements.

5. Critical Technologies

As evidenced by agency rating of the importance of a wide variety of technologies and vendor ranking of the same technologies, federal agencies believe that they have specific needs and little interest in the application of wide-ranging technologies. As indicated in Exhibit VI-8, vendors believe that the most critical technology need is for LAN integration (as do agencies). Systems to manage these networks follow closely in the rankings. Neither agencies nor vendors consider cellular telephones, ISDN, VSATs, or satellite networks to be of great importance. ISDN will grow in importance over the three year-period, but not to a great extent. E-mail and electronic commerce as well as ATM and Sonet are clearly important and will become increasingly important over the next three years.

Exhibit VI-8

**Vendor Ranking of Criticality of
Telecommunications Technologies**

Technology	Rank*	
	Market Today	By 1997
LAN Integration	1	1
Network Management Systems	2	1
Electronic Mail/EC	3	2
ATM and Sonet	4	3
VAN Services	5	5
Satellite Networks	6	6
VSAT Networks	7	8
ISDN	8	4
Cellular Telephones	9	7

* Based on average ratings by respondents: 1-5 scale, where 5 = extremely critical and 1 = not critical at all

6. Standards

Vendors and federal agencies agree that the federal government should migrate toward the use of interoperability standards for telecommunications protocols, such as TCP/IP. Although the National Institute of Standards and Technology (NIST) adopted a set of internationally recognized communications protocols as the Government Open Systems Interconnection Profile (GOSIP) standard, most agencies have balked at its adoption. NIST has recently backed "mandating" GOSIP.

GOSIP is still a long term goal, but will serve as a framework as much as a set of specifications. TCP/IP continues to grow in popularity, especially with agencies interested in and using Internet. As a solution for and insulation against the shifting set of standards and proprietary protocols available, several vendors and consortia have adopted "middleware" strategies. Middleware, such as the Open Systems Foundation's (OSF) Distributed Computing Environment (DCE) and Distributed Management Environment (DME) isolate operating system and network protocols from applications. This allows telecommunications transport and access to be handled as separate entities and not be dependent on specific protocols.

Communications protocol conformance has become an important marketing tool in developing products and services that reflect users' demand for products that implement common standards. Both industry and government see the need to continue to coordinate their efforts in protocol and standards development.

D

Vendor Concerns

In discussing the federal telecommunications market, vendors voiced several concerns about federal organization, staffing, and procurement practices.

1. Federal Organization and Staffing

Vendors continue to express frustration with government progress toward integrated voice and data communications management. Although each agency's Office of Information Resources Management (OIRM) is chartered to manage both data and voice communications, necessary organizational and operational changes are being implemented slowly.

Because of this confusion, vendors have had difficulty determining exactly which office or offices (including headquarters versus the field) are responsible for telecommunications requirements and initiatives. In some cases, where agency voice and data communications are acquired and managed separately, vendors continually receive contradictory information about long-range telecommunications plans.

Downsizing in government is presenting vendors with additional challenges. Not only are personnel with years of experience being replaced, the vendor must restart the education process with new personnel. Further, many agencies are contemplating organizational and functional mergers, so that vendors must gain new knowledge.

2. Vendor Improvements to Products and Services

Vendors were asked what practices and services they believe vendors should change or improve over the next five years to make their products and services more valuable to the federal government. Replies varied, correlating to the different types and degrees of experience the vendors have encountered with federal agencies. Although the responses varied, there was a consistent theme. As shown in Exhibit VI-9, vendors believe that there is a need for general technical and product education. Following this, other considerations are of considerably less importance although vendors are beginning to receive the message about standardized, interoperable products. Agencies agree with the need to provide technical and general education. Ensuring that agency staff have up-to-date information about technology trends was the need most frequently mentioned by agency respondents.

Exhibit VI-9

Vendor Suggestions to Improve Responsiveness to Federal Telecommunications Needs

Suggestions	Percent of Responses*
Provide More General Technical and Product Education	35
Develop More Standardized Products	20
Present Products Honestly	10
Provide Flexible Services	10
Offer Creative Solutions	10
Fully Support Configurations	10
Maintain Staff Stability	10
Understand Regulations	10

* Does not add to 100%, multiple responses allowed.

3. Factors Affecting Government Spending

Vendors surveyed by INPUT suggested several factors that could increase or decrease federal government spending on telecommunications products and services over the next two to five years. As shown in Exhibit VI-10, the most significant factor will be the FTS 2000 follow-on. Technology continues to be a frequently cited factor by vendors, in this case new products and distributed processing.

Exhibit VI-10

Significant Factors That Will Affect Federal Use Of Telecommunications Services Through 1999

Factors	Rank*
FTS 2000 Follow-On	1
Increased Use of New Technology	2
Increased Use of Distributed Processing	2
Budget Problems	3
Network Management	4

* Based on frequency of mention by respondents.

Until the FTS 2000 follow-on is settled, vendors will continue to be unsure about government plans and how even non-FTS acquisitions will be affected.

4. Agency-Required Actions

Selling to the federal government is a lengthy and difficult process. Vendors believe that the government should take a number of actions to improve its use of telecommunications services. As shown in Exhibit VI-11, shortening the procurement cycle is the most frequently mentioned action. Following the change in procurement procedures, vendors believe that agencies would benefit from specifying requirements not identifying solutions. Vendors also believe that agencies have to make efforts to train their staff in telecommunications basics when they are newly assigned to these responsibilities.

Exhibit VI-11

Government Actions to Use Telecommunications More Effectively

Actions	Rank*
Shorten Procurement Cycle	1
Improve Technical Expertise	2
Specify Requirements, Not Solutions, In More Umbrella Contracts	3
Improve Technical Communications With Vendors	4
Share Technology And Technical Resources Between Agencies	5

* Rank based on frequency of mention.

E**INPUT Recommendations**

Telecommunications vendors need to invest more time and effort in understanding agency missions and related communications requirements. Vendors need to be aware that in the federal contracting environment, there are many acquisitions that support multiple missions.

Further, there are other acquisitions supporting several parts of an agency with diverse functions. This type of acquisition covers numerous requirements under one contract, which ultimately limit the number of telecommunications opportunities in that agency. An understanding of hidden constraints and future federal directions is essential to a successful bidding strategy. Recommendations are summarized in Exhibit VI-12.

Vendors can assist agencies in preparation of better solicitations while improving their own strategic positions. To assist the federal government, vendors could offer briefings or seminars on key technical issues and regularly respond to agency Requests For Information (RFIs) and Statements of Work. Vendors might also send technical bulletins to agency management, technical, and contracting officials.

Exhibit VI-12

Recommendations to Vendors

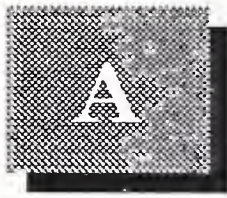
- Understand agency requirements
- Offer briefings and seminars
- Focus on long-term solutions
- Emphasize corporate stability
- Strengthen after-sales support
- Strengthen alliance positions
- Focus on interoperability

Vendors should emphasize comprehensive, lasting solutions to agency telecommunications requirements. Single-vendor proposals for federal telecommunications programs must also address numerous agency concerns. Among these agency concerns, vendors should include mention of long-term compatibility and expandability of the proposed system, and the potential for integration of voice/data communication. Vendors should emphasize corporate stability and a commitment to the telecommunications market. Finally, vendors should be aware of potential for additional revenues from continuation of services after award and implementation, particularly for communications hardware.

Vendors wishing to enter or expand their share of the federal telecommunications market face a number of significant barriers. Competition in the federal market requires considerable pre-solicitation investment. Also, many new federal telecommunications systems have been acquired within the last few years, with projected system life cycles of five to ten years. Further, development of attractive new telecommunications products and services is costly in terms of capital investment and qualified personnel.

To overcome these barriers, and ultimately save valuable time and money, vendors should investigate alternative strategies for new-product development. Newer or smaller companies should develop teaming or subcontracting relationships with larger, more experienced federal telecommunications vendors, concentrating on vendors active in systems integration.

Vendors should also target new products and services for specific growth areas of interest of the federal government. These areas include interconnection and interoperability of existing hardware and teleconferencing facilities, and professional services, such as training and system design, management, and maintenance. Innovative products and services will be needed to realize a measurable federal market share.



Interview Profiles

A

Federal Agency Respondent Profile

1. Contact Summary

For this study INPUT interviewed 17 agency personnel.

- Policy-makers - 11
- Program Managers - 6

2. List of Agencies Interviewed

Department of Agriculture

Department of the Air Force

Department of the Army

U. S. Coast Guard

Defense Information Systems Agency

Federal Deposit Insurance Corp.

Financial Management Service

General Services Administration

Health Care Finance Administration

Department of Health and Human Services

Department of Housing and Urban Development

Department of Interior

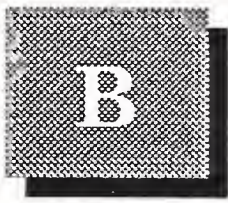
National Aeronautics and Space Administration

National Oceanographic and Atmospheric Administration

Department of Transportation

Department of Treasury

Department of Veterans Affairs



Telecommunications Opportunities

This appendix lists specific opportunities and recent awards in the federal information technology market. Lists of programs are provided for future telecommunications and related services. The opportunities list consists of major programs that are typical of the federal market and serves as a representative sample. The recent awards section contains a list of programs previously tracked by INPUT that have been awarded.

A

Present and Future Programs

Funding for telecommunications is provided in several budget categories of federal government agencies. New information technology programs including telecommunications acquisitions that are larger than \$1-2 million, are listed in at least one of the following federal government documents:

- OMB/GSA/NIST Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11
- Agency long range information resource plans developed to meet the reporting requirements of the Paperwork Reduction Act of 1980
- Agency annual operating budget requests submitted to both congressional oversight and appropriation committees based on OMB A-11
- Commerce Business Daily notice of specific opportunities, for qualification as a bidder and for requesting a copy of an RFC or RFP
- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies

Telecommunications opportunities may or may not be specifically identified as such in the following documents:

- Information resource management (IRM) plans that usually identify mission requirements to met by specific programs, rather than methods for meeting those requirements

To add to the difficulty of identifying planned telecommunications buys, most medium and smaller buys (valued at less than \$1 million) are rarely identified in agency budget documents.

All funding proposals are based on cost data of the year submitted, with inflation factors dictated by the Administration as part of its fiscal policy, and are subject to revision, reduction, or spread to future years in response to Congressional direction. Some additional reductions will be likely in fiscal 1995 and beyond due to deficit reduction efforts.

B

Telecommunications Funding Requests

Although the following programs may require other products or services, they all include telecommunications support. Telecommunications funding requests are from FY 1995, A-11, 43 B submissions. Many entries have "unknown" under the Funding category. This usually indicates a pre-RFP status in which the agency has not announced a contract value.

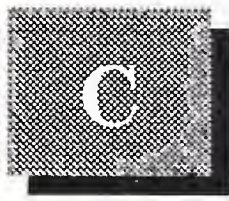
AGENCY	PROJECT	FUNDING (\$000)
Agriculture:		
USDA/HQ	Info Share Program	\$2,600,000
USDA	PC/LANs/WANs	Unknown
Air Force:		
Air Force	Voice Processing System	Unknown
Army:		
Army	Command Information Management	Unknown
Army	World-Wide Command and Control	\$1,708,100
Commerce:		
Comm. HQ	Automated Procurement System	Unknown

AGENCY	PROJECT	FUNDING (\$000)
Defense:		
DoD/DECCO	Hawaii Information Transfer System	\$85,000
DoD/DISA	Defense Info. Systems Network	\$1,000,000
DoD/DISA	DISN for CONUS	\$400,000
DoD/DISA	Systems Engineering and Technical	\$50,000
DoD/DISA	CONUS Meteorological Data System	Unknown
Education:		
Education HQ	Title IV Network	Unknown
Energy:		
Energy	Licensing Support System	\$200,000
Energy	Integrated Voice/Data	Unknown
Energy	ADP Support Services	\$15,000
Energy	IRM Support Services	Unknown
EPA:		
EPA IRM	Nat. Computer Center Support	\$302,000
GSA:		
FEDSIM	Multiple Award	\$5,000,000
GSA	Aggregated Switch Systems	\$266,000
GSA	Telecommunications Support	Unknown
GSA HQ	FTS 2000	\$25,000,000
HHS:		
HHS HQ	Videoconferencing System	Unknown
HHS	Telecommunications Support	Unknown

AGENCY	PROJECT	FUNDING (\$000)
Justice:		
JMD	Consolidated Network Systems	Unknown
JMD	Consolidated Offices Systems	\$500,000
JMD	Telephones Systems	Unknown
JMD	Technical Support Services	Unknown
Labor:		
Labor	Black Lung Automated Support	Unknown
Labor HQ	ADP Support Services	\$45,000
NASA:		
NASA HQ	NASA HQ Info. Systems Support	\$200,000
Navy:		
Navy	Authoring Instructional Systems	Unknown
Navy	NCTC Support Services	\$50,000
Navy	New Technologies Program	\$90,000
Navy	Tactical Advanced Computer	\$90,000
Navy	Technical Support Services	Unknown
State:		
State Admin.	Consolidated Telecom. Support	Unknown
Transportation:		
DOT HQ	Recovery Communications Network	Unknown
DOT HQ	FIPS Support Services	\$25,000
DOT	ADP Support Services	Unknown

AGENCY	PROJECT	FUNDING (\$000)
Treasury:		
IRS	Treasury Info. Processing Support Sys.	\$350,000
Treasury HQ	Treasury Communications System	\$350,000
Treasury	PC Cash Register System	Unknown
Treasury	Telecommunications Support	Unknown
Veterans Admin.:		
VA	Medical Center Telephone	Unknown

Blank



Glossary of Federal Abbreviation

A

Federal Agency Abbreviations

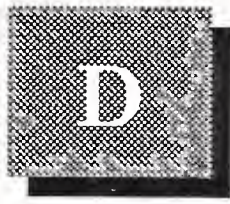
DECCO	Defense Commercial Communications Office
DISA	Defense Information Systems Agency (Formerly DCA)
DoD	Department of Defense
DSN	Defense Switched Network
DTIC	Defense Technical Information Center
DTN	Defense Transmission Network
FCC	Federal Communications Commission
FIPR	Federal Information Processing Resource
FIPS	Federal Information Processing Standard
FIRMR	Federal Information Resource Management Regulations
FPR	Federal Procurement Regulations
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA
FTS	Federal Telecommunications System

FTS 2000	Replacement of the Federal Telecommunications System
FY	Fiscal Year
FYDP	Five-Year Defense Plan
GOSIP	Government Open Systems Interconnection Profile
GPO	Government Printing Office
NASA	National Aeronautics and Space Administration
NCS	National Communications System (evolving to DISN)
NIST	National Institute of Science and Technology (was NBS)
NSA	National Security Agency
NTIA	National Telecommunications and Information Administration, Department of Commerce; (replaced the Office of Telecommunications Policy in 1970)
NTIS	National Technical Information Service
PAR	Procurement Authorization Request or Procurement Action Report
WITS	Washington Interagency Telecommunications System

B

General and Industry Abbreviations

RBOC	Regional Bell Operating Company
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Policies, Regulations, Standards and Key Agencies

A

OMB Circulars

A-11	Preparation and Submission of Budget Estimates
A-49	Use of Management and Operating Contracts
A-71	Responsibilities for the Administration and Management of Automatic Data Processing Activities
A-109	Major Systems Acquisitions
A-120	Guidelines for the Use of Consulting Services
A-121	Cost Accounting, Cost Recovery and Integrated Sharing of Data Processing Facilities
A-123	Internal Control Systems
A-127	Financial Management Systems
A-130	Management of Federal Information Resources
A-131	Value Engineering

B

GSA Publications

The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition and use of both ADP and telecommunications information resources.

C**DoD Directives**

DD-5000.1	Major System Acquisitions
DD-5000.2	Major System Acquisition Process
DD-5000.11	DoD Data Administration (C3I)
DD-5000.31	Interim List of DoD-Approved, High-Order Languages
DD-5000.35	Defense Acquisition Regulatory Systems
DD-5200.1	DoD Information Security Program
DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems
DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing and Evaluating Secure Resource Sharing ADP Systems
DD-7920.2	Major Automated Information Systems Approval Process
DD-7935	Automated Data Systems (ADS) Documentation
DoDD 3405.1	Computer Programming Language Policy
DoDD 5000.11	DoD Data Administration (C3I)
DoDI 5000.12	Data Elements and Data Codes Standardization Procedure
DoDI 5000.18	Implementation of Standard Data Elements and Related Features
DoDD 5105.19	Defense Information Systems Agency
DoDD 5110.4	Washington Headquarters Services
DoDD 5118.3	Comptroller of the Department of Defense

DoDD 5137.1	Assistant Secretary of Defense (Command, Control, Communications and Intelligence)
DoDD 7740.1	DoD Information Resources Management Program
DoD 7740.1-G	DoD ADP Internal Control Guideline
DoDD 7740.2	Automated Information System (AIS) Strategic Planning
DoDI 7740.3	Information Resources Management (IRM) Review Program
DoDD 7750.5	Management and Control of Information Requirements
DoDI 7750.7	DoD Forms Management Program
DoDI 7920.2-M	Automated Information Systems (AIS) Life-Cycle Manual
DoDI 7920.4	Baselining of Automated Information Systems (AISs)
DoDI 7920.5	Management of End-User Computing (EUC)
DoDI 7930.1	Information Technology Users Group Program
DoDI 7930.2	ADP Software Exchange and Release
DoDD 7950.1	Automated Data Processing Resources Management
DoD 7950.1-M	Defense Automated Resources Management Manual of Information Requirements

D**Standards**

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NIST FIPS 71
CCITT G.711	International PCM standard

CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits
DEA-1	Proposed ISO standard for data encryption based on the NIST DES
EIA RS-170	Monochrome video standard
EIA RS-170A	Color video standard
EIA RS-464	EIA PBX standards
EIA RS-465	Standard for Group III facsimile
EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network
EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24
EIA RS-449	New EIA standard DTE to DCE interface that replaces RS-232-C
FED-STD 1000	Proposed federal standard for adoption of the full OSI reference model
FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46
FED-STD 1041	Equivalent to FIPS 100
FED-STD 1061	Group II facsimile standard (1981)
FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465
FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466
FED-STDs 1005	Federal standards for DCE coding and 1005A-1008 modulation
FIPS 46	NIST Data Encryption Standard (DES)

FIPS 81	DES Modes of Operation
FIPS 100	NIST standard for packet-switched networks; subset of 1980 CCITT X.25
FIPS 107	NIST standard for local-area networks, similar to IEEE 802.2 and 802.3
FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP)
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard
IEEE 802.2	OSI-Compatible IEEE standard for data-link control in local-area networks
IEEE 802.3	Local-area network standard similar to Ethernet
IEEE 802.4	OSI-compatible standard for token bus local- area networks
IEEE 802.5	Local-area networks standard for token ring networks
IEEE P1003.1	POSIX standard, similar to FIPS 151
MIL-STD-	Physical interface protocol similar to RS-232 and 188-114CRS-449
MIL-STD-1777	IP-Internet protocol
MIL-STD-1778	TCP - Transmission Control Protocol
MIL-STD-1780	File transfer protocol
MIL-STD-1781	Simple mail transfer protocol (electronic mail)
MIL-STD-1782	TELNET - virtual terminal protocol
MIL-STD-1815A	Ada programming language standard
SVID	UNIX System Interface Definition
X.12	ANSI standard for electronic data interchange

X.21	CCITT standard for interface between DTE and DCE for synchronous operation on public data networks
X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks
X.75	CCITT standard for links that interface different packet networks
X.400	ISO application-level standard for the electronic transfer of messages (electronic mail)

E

Key Players in Regulations, Standards, and Policy

Although the agencies described below are not major telecommunications users, their activities help to mold individual user agency telecommunications policy and plans.

1. Federal Communications Commission

The Federal Communications Commission (FCC) was established by the Federal Communications Act of 1934. Its mission includes regulation of interstate and international communications, scientific and technical support, and long-range policy and analysis. The FCC shares communications oversight with two other agencies.

- The FCC and the National Telecommunications and Information Administration (NTIA) jointly manage radio frequency assignment. NTIA has responsibility for federal radio frequencies, and the FCC handles the private sector.
- In times of national emergency, many of the responsibilities of the FCC transfer to the National Communications System (NCS).

The FCC affects the future of the federal telecommunications market through the continuing examination of deregulation (Computer Inquiry III) and of the effects and conditions of the AT&T divestiture.

The Inquiry III proceedings led to the establishment of nine points for Comparatively Efficient Interconnects (CEI). These points aim to

promote standardization interfaces and common end-user access enhancement.

The FCC participated in the past in Consultation Committee International of Telegraph and Telephone (CCITT) study groups to define integrated services digital network (ISDN) standards. The FCC focuses on the standards that govern interfaces. The FCC also interacts with domestic and international telecommunications organizations on spectrum management and interference.

2. National Telecommunications and Information Administration

The National Telecommunications and Information Administration (NTIA) was established as part of the Commerce Department in 1987 through a reorganization of the Office of Telecommunications Policy in the Executive Office of the President and Commerce's existing Office of Telecommunications. NTIA serves as one of the President's principal advisors on telecommunications and information issues and provides assistance to other federal agencies in the areas of telecommunications planning, design maintenance, and improvement. NTIA sets federal telecommunications policy in three areas:

- Policies for which the government conducts its activities internal to the federal agencies
- Policies for industry and coordination of overlap between industry and federal agencies
- Policies for ISDN standards definition; working with the FCC and CCITT Study Groups

NTIA receives most of its sponsorship from the DoD and in particular the Army, DISA and NCS. The NTIA also assists with maintaining a central point of contact for the DDN, thus assuring emergency preparedness.

There is also ongoing cooperative work with NCS to develop federal modem and data encryption standards (DES), including federal standards (FED-STDs) equivalent to the CCITT V.22bis, V.26, V.26vis, and V.32 standards and FED-STDs 1028 and 1029 for the application of DES to facsimile and digitized voice transmission. NTIA is not a decision-making body, but serves as a principal voice for the executive branch in domestic telecommunications policy that affects technical and economic advancement.

3. National Communications System

The National Communications System (NCS) and the Federal Telecommunications Standards Program were established in 1972. In addition to its national emergency role in telecommunications, NCS develops the federal telecommunications standards (FED-STDs), which are issued subsequently by GSA. The ongoing NCS standards activities focus on two areas of concern to federal agencies:

- Interoperability of computer and communications systems
- Development of ISDN standards with CCITT

4. National Institute for Standards and Technology

The National Institute for Standards and Technology (NIST), formerly the National Bureau of Standards, is part of the Department of Commerce. A primary function of NIST is to develop and issue the Federal Information Processing Standards (FIPS) under the provisions of Public Law 89-306 (the Brooks Act). Much of the actual development of the FIPS is done by the National Computer Systems Laboratory at NIST.

In response to the merging of communications and computer technology, standards development at NIST has increasingly involved joint efforts with NCS, such as the federal X.25 standard (FIPS 100, FED-STD 1041). NIST also works with DoD to develop military specifications (MIL SPEC) equivalents to the FIPS.

NIST has been concentrating on the development of federal standards compatible with CCITT open systems interconnect (OSI) recommendations. Despite a clear preference on the part of NIST officials for OSI standards, NIST cannot mandate federal agencies' compliance. Federal policy in such matters must be set by OMB and enforced by GSA.

NIST sponsors a number of vendor programs to promote commercial development and implementation of OSI-compatible systems. It holds OSI workshops, which are very successful. They are held four to five times a year, with over 150 individuals in attendance at each. MAP/TOP demonstrations that use communications protocols based on OSI standards (FIPS 107, IEEE 802.2 and 802.3) are organized by various Special Interest Groups (SIGs). OSINET, a packet-switched network for development and testing of OSI products, is complete and on-line.

At the request of the Department of Defense, NIST established an accreditation program for private laboratories prepared to test the

computer industry's implementation of numerous Defense Department telecommunications protocols. The program will accredit labs capable of performing tests in accordance with methods designated by the institute. NIST will be certifying laboratories that can provide testing for three DoD protocols in particular: The Defense Data Network (DDN) X.25 link, the five DoD packet-switching high-level protocols, and the Autodin Mode protocol.

5. National Security Agency

Under National Security Directive 145, the National Security Agency (NSA) was delegated responsibility for government-wide communications security. However, as previously stated, NIST has primary responsibility for implementing the Computer Security Act. Specific information about NSA activities is available only to cleared individuals and corporations.

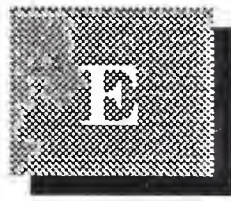
NSA continues to seek vendor cooperation in the applications of government cryptographic methods to commercial systems through the Commercial Comsec Endorsement Program (CCEP). NSA programs to certify trusted computer systems will influence the development of DoD communications systems such as the Defense Systems Network (DSN). DoD plans include the use of trusted software in programmable communications equipment such as digital switches. However, the time and expense associated with NSA certifications is discouraging many vendors.

6. Office of Management and Budget

The Office of Management and Budget (OMB) has taken a very active interest in the regulatory aspects of the telecommunications market and in federal agency plans for telecommunications systems. Under circular A-130, OMB will "...serve as the President's principal advisor on procurement and management of federal telecommunications systems."

OMB has increased its monitoring of sole-source telecommunications procurements, some of which may be represented by the agencies as a continuation of existing (pre-divestiture) contracts. OMB foresees potential legal problems for the government if such procurements are permitted in a newly competitive market subject to CICA and public scrutiny.

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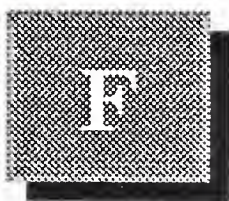
Related INPUT Reports

Federal Telecommunications Market, 1992-1997

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Federal Information Systems and Services Market: FY 1994-FY 1999

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Federal Agency Questionnaire

INPUT

FEDERAL TELECOMMUNICATIONS MARKET 1994-1999

Federal Agency Questionnaire

(Compressed for reprint)

First, we would like your help in understanding your planned expenditures for telecommunications. We would like to read a list of your agency's budget submissions and then ask a couple of questions about the figures. The remainder of the questions deal with specific network technologies and services.

1. Presented below are your agency's total telecommunications expenses (based on 43a/b submissions and IRM plans). Please review each of the six (6) categories in both FY95 and FY99 and provide a brief explanation of the increase (+) or decrease (-).

	(000) FY95	(000) FY99	Annual % Diff.	WHY Increase/Decrease?
Leased Voice	_____	_____	_____	_____
Leased Data	_____	_____	_____	_____
Network Svcs.	_____	_____	_____	_____
Hardware	_____	_____	_____	_____
Software	_____	_____	_____	_____
Prof. Services	_____	_____	_____	_____

2. What percentage of your agency's **data** network requirements are currently being met by the following types of networks for FY95 and will be met for FY99?

	FY95	FY99	Why Increase/Decrease?
FTS 2000	_____	_____	_____
DDN	_____	_____	_____
Single Provider	_____	_____	_____
Sys. Integrator	_____	_____	_____
Agency Network	_____	_____	_____

3. Please rank, on a scale of 1-5 (with 1 as low), how well the FTS 2000 (and/or DISN) network will be able to meet your agency's needs over the next five years.

_____	Voice	_____	Data
_____	Network Svcs.	_____	Admin. Svcs.

What particular technology or service of FTS 2000 (and/or DDN) currently supports your agency the best?

What particular technology or service of FTS 2000 (and/or DDN) currently provides the least effective support?

What are the top three technologies or services you would like to see adopted by FTS 2000/DISN in the next five years?

(a)_____ (b)_____ (c)_____

4. For your **data** networks, what percentage is managed in-house or by contractor?

FY95 FY99

_____ _____ In-house (agency only)

_____ _____ Contractor (any third party)(If 100 go to 6)

For in-house: Has your agency considered contracting out for data networks? YES NO

Why/Why not? _____

5. For in-house network management, what percentage is centralized vs. decentralized?

FY95 FY99

_____ Centralized

_____ Decentralized

(For "Both", get explanation--WAN vs LAN etc.)

6. Does your agency plan to implement centralized data network management centers over the next five years? YES NO

WHY? _____

What protocol(s) will be primarily used by the agency?

Will your agency be merging network and systems management functions and support systems? YES NO

WHY? _____

WHEN? _____

7. What percentage of your network needs are served by VANs?

_____ FY95 _____ FY99

8. Can you estimate the number of LANs in the agency for:

_____ FY95 _____ FY99

9. What percentage of LANs are integrated (linked with other LANs or WANs)?

_____ FY95 _____ FY99

10. On a scale of 1-5 (with 1 as low), how important are integrated network services to your agency? _____ Ranking

11. Does your agency have any specific plans for network integration over the next five years? YES NO(go to 13)

WHAT? _____

12. If you have integration plans, rank on a scale of 1-5 (with 1 as low) the following approaches for their support in meeting your agency's needs:

_____ FTS 2000

_____ DDN/DISN

_____ In-house

_____ Contractor

_____ Other

13. On a scale of 1-5 (with 1 as low), rank the following as preferred means of acquiring additional or new network systems or services:

_____ Use GSA or DCA sponsored services

_____ Purchase common carrier services

_____ Purchase VAN services

_____ Purchase integration services

_____ In-house integration of purchased components

_____ Contractor integration of purchase components

_____ Other

14. On a scale of 1-5 (with 1 as low), rank the following network technologies in importance to your agency over the next five years:

_____ ATM

_____ T1-Fractional

_____ B-ISN

_____ T3-Fractional

_____ Bandwidth-on-demand

_____ VSAT

_____ Frame Relay

_____ Widechannel Video

_____ ISDN

_____ Wireless LAN

_____ Multimedia

_____ Wireless Mobile

_____ Satellite _____ Wireless Voice
 _____ Smart Muxes _____ Other, specify _____
 _____ SMDS _____
 _____ SONET

15. On a scale of 1-5 (with 1 as low), rank the following network services in importance to your agency over the next five years:

_____ Desktop News _____ International Video
 _____ Desktop Videoconferencing _____ Internet Access
 _____ Directory Services _____ Kiosk Support
 _____ EDI/EFT _____ Privacy/Security
 _____ E-mail _____ Telecommuting Support
 _____ International Connectivity _____ Other, specify _____

16. In your opinion, what are the three most significant factors that will affect your agency's use of telecommunications services over the next five years—either positively or negatively?

(a) _____ P N
 (b) _____ P N
 (c) _____ P N

20. The FTS 2000 follow-on is generating a lot of debate. Will the potential merger of FTS and DISN be:

POSITIVE NEGATIVE

WHY? _____

Do you think that the FTS 2000/DISN follow-on should be mandatory?

YES NO

WHY? _____

Do you think that the FTS 2000/DISN follow-on should be multiple-award?

YES

NO

WHY? _____

21. What do you consider the top three weaknesses of vendors that provide data network services to your agency?

(a) _____

(b) _____

(c) _____

22. What are the most important types of products and services vendors should provide over the next five years? What considerations, such as cost, quality, training are most important?

(a) _____

(b) _____

(c) _____

23. What top three steps should vendors take to be more responsive in meeting your agency's telecommunications needs?

(a) _____

(b) _____

(c) _____

THE END -- Thank You.

